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Power Pooling in the South Central Region

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FEDERAL ENERGY REGULATORY COMMISSION
OFFICE OF ELECTRIC POWER REGULATION
WASHINGTON,DC 20426

February 1981

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Power Pooling in the South Central Region

Prepared by the
South Central Regional Task Force

For the
Federal Energy Regulatory Commission
Office of Electric Power Regulation
Washington, DC 20426

February 1981

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FOREWORD

This report is one of five regional reports prepared by task forces as part of the Federal Energy Regulatory Commission (FERC) power pooling study under the provisions of Section 205(b) of PL 95-617, the Public Utility Regulatory Policies Act of 1978 (PURPA). The Act directs the Commission to conduct a study of power pooling and report its findings to the President and Congress. The purpose of the study is to examine "the opportunities for (a) conservation of energy, (b) optimization in the efficiency of use of facilities and resources, and (c) increased reliability through power pooling arrangements."

The regional task forces were formed after consultation with industry and regulatory representatives. Each member of the five regional task forces served primarily as an individual, contributing personal knowledge and interpretations, and provided information on industry activities and problems on the basis of this expertise.

The regional reports reflect the work of the task forces in addressing the characteristics and problems of coordinated electric power operations in each region. The purpose of the task forces was to assist in developing a regional-specific factual understanding of the development, status, problems, plans, benefits, cost, industry and regulatory views, and other significant aspects of power pooling in the region.

In addition to the regional task force reports, which are primarily descriptive, a separate report is being submitted to the President and the Congress containing an overall assessment of the status of power pooling and the prospects for increased application of power pooling in the United States by the electric utility industry. This assessment and report is based in part on the reports and proceedings of the task forces.

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EXECUTIVE SUMMARY

The task force has adopted the following definition of power pooling:

> The physical interconnection and operation of the generation and transmission system owned by two or more utility systems with the objective of reducing the cost of electric power and energy by obtaining the benefits of joint capacity planning and facility operations.

The South Central Region is coextensive with the combined areas of two major electric coordination groups--the Electric Reliability Council of Texas (ERCOT) and the Southwest Power Pool (SPP). The region consists of 648 utilities--508 in the SPP area and 140 in ERCOT. Most of these are municipal (385) or rural cooperative (222) systems but a few State-owned and Federal systems also exist. Of the 32 investor-owned systems, 24 are in the SPP and 8 are in ERCOT. Twenty-one of the municipal systems are electrically isolated--otherwise all the utilities are interconnected with other systems in their respective region.

The SPP is strongly interconnected with other reliability council systems to the north and east but ERCOT is electrically isolated from the rest of the Nation. Both of these groups are loosely organized to coordinate their overall internal operations but have no formal binding agreements applicable to all members regarding power supply and reliability. Such agreements are usually on a system-to-system basis and between members of the more closely coordinated smaller groupings such as Middle South Utilities, Inc. (MSU), Texas Utilities Company System, (TUSI), Missouri-Kansas Pool (MOKAN), South Central Electric Companies (SCEC), and other cooperative and municipal-type organizations of the region.

The MSU, a holding company comprising about 15 percent of the installed capacity in the region, is operated under central dispatch and comes closer to the idealistic concept of power pooling than any other organization in the region. The MOKAN Pool, although not under central dispatch, maintains a minimum reserve that is enforced by penalties, constructs jointly owned units, and coordinates maintenance. The SCEC diversity interchange with the Tennessee Valley Authority (TVA) has resulted in postponing investment in 3,000 MW of capacity and other benefits. To ensure reliability, the Texas Interconnected System (TIS) in the ERCOT area coordinates reserve requirements, completes joint stability studies, and coordinates generator installations. The TUSI, representing about 40 percent of the installed capacity of ERCOT, coordinates the construction and operation of generating units of TUSI member systems. Smaller coordinating groups in the region and system-to-system agreements were organized to allow joint construction of units, to share reserves, to provide interchange of economy energy, and to promote mutual interests. The combined pooling efforts of the MSU, TUSI, MOKAN, SCEC, TIS, other smaller coordinating groups, and system-to-system agreements in the region have collectively reduced reserve requirements, increased reliability, and resulted in savings through construction of larger units, exchange of economy energy, and coordinated maintenance schedules.

Major impediments to additional power pooling in the region are as follows:

- The parochialism of governing and regulatory authorities
- Legal and regulatory constraints on interconnections
- Legal prohibitions against investments outside of service areas and corporate boundaries
- Difficulty in reaching an agreement on fair compensation and due consideration of systems operation for wheeling
- Forestalling of timely construction of jointly owned facilities when one or more of the participants are required to prepare environmental impact statements
- Distrust engendered by the "public vs. private" power controversy
- Financial problems in general and those resulting from the failure of governing or regulatory agencies to grant authorization of construction funds or rate relief, and
- Uncertainties as to future costs, energy supplies, regulatory actions, etc.

Some of the philosophic and legal impediments, however, are being reduced or eliminated because of the mutuality of problems that result from increasing investment and operating costs, environmental constraints, fuel shortages, etc.

Efforts are underway to examine and establish "brokerage" systems to facilitate economy energy interchange and to develop more sophisticated communications and data gathering equipment, all of which could enhance pooling activities and benefits for both ERCOT and the SPP as well as for other groups. ERCOT and the SPP are not expected to engage in central dispatch operations in the foreseeable future because of (1) the difficulties encountered in consummating agreements among the great number of nonassociated entities, and (2) the great distances involved. However, the existing internal pooling and coordination groups will undoubtedly practice more intensive pooling when future growth and budgeting require and justify it. Moreover, as the technologies and the economies develop, central dispatch may become a reality in both ERCOT and the SPP.

CHAPTER 1
INTRODUCTION

APPROACH TO THE ASSIGNMENT

The task force was assembled by the chairman on June 14, 1979, at the Fort Worth Office of the Federal Energy Regulatory Commission (FERC). Subsequent meetings were held in July, August, September 1979, and May 1980. These meetings were open to the public; however, no public attendance as such was observed. All members or their alternates attended and participated in the meetings with one or two exceptions. Also, representatives of the Washington FERC staff and the regional representative of the Office of Utility Systems, Economic Regulatory Administration, attended each meeting. In general, although the meetings had a prescribed agenda, discussions were wide ranging and responsive to posed questions.

In addition to discussions respective to specific questions, assignments were made to individual task force members to submit papers on certain subjects, and the resulting material was utilized as appropriate in this report. Furthermore, with the exchange of the general notes and the distribution of certain papers submitted by members, a certain amount of cross-fertilization of ideas and information has occurred between task forces.

One of the fundamental characteristics of the South Central Region is the absence of interconnections between the utilities of ERCOT and those in adjoining States. The ERCOT systems, representing the bulk of Texas electric power supply, form an island that is self-sufficient. Although the desirability of this situation is debatable, the absence of operating interstate tielines means that, at present, ERCOT systems can coordinate and pool with each other only. By contrast, the SPP systems are interconnected with utilities to the east and north, so that coordination in the SPP potentially can include a variety of power and energy interchanges with other areas.

The issue of interstate interconnections between ERCOT and the SPP has been raised in a proceeding at FERC. The four member utilities of the Central and South West Corporation (CSW), a holding company, two of which are in ERCOT and two in the SPP, have petitioned* the Commission for interconnection and wheeling orders under new authorities established by the Public Utility Regulatory Policies Act of 1978. The petitioners' contention is that significant savings can be achieved by pooling and coordinating the operations of the four member utilities with a properly designed interconnection arrangement. Because the formal proceeding is examining the merits of the case, they will not be considered in detail in this study and report. Consequently, the task force examines ERCOT separately on the basis that it is not interconnected with the SPP.

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*Docket No. EL 79-8.

DEFINITION OF POWER POOLING

Because of the diverse nature of electric power systems, the increase in the number of types of interconnection agreements between electric utilities, and the different views of individuals, the term "power pooling" does not have a precise and standardized definition. Conceptually, the term has been used to imply the joint operation and planning of two or more utility systems as though they were a single system. In practice, this has never been totally achieved because of the separate legal and ownership responsibilities of the individual systems. Coordination, therefore, has ranged from informal planning coordination to formal contractual agreements with specific penalties for nonconformance.

In the past, FERC has tended to classify as "pools" only those systems that have filed formal contractual agreements; several groups call themselves pools though they do not have contractual agreements. Also, the terms of contractual agreements vary widely. Therefore, the study of power pooling is to some degree an examination of the whole spectrum of coordination arrangements, although the greatest emphasis tends to be on the more completely specified and contractual forms.

After considerable deliberation, the South Central Task Force adopted the following definition for power pooling:

> The physical interconnection and operation of the generation and transmission system owned by two or more utility systems with the objective of reducing the cost of electric power and energy by obtaining the benefits of joint capacity planning and facility operations.

The task force recognizes different levels of pooling such as (1) full economic dispatch, (2) joint facilities participation, (3) power brokerage pooling, and (4) economy and other power exchange transactions by voluntary coordination between companies.

DEFINITION OF THE SOUTH CENTRAL REGION

The South Central Region includes the entire States of Kansas, Oklahoma, Arkansas, and Louisiana; all but the extreme western tip of Texas; and portions of Mississippi, Missouri, and New Mexico, as indicated by Figure 1. The electric facilities in the region and adjacent areas are also indicated in Figure 1, which shows major transmission and generating stations. There are 648 electric utilities in the region with a total installed capacity of 94,324 MW and a total noncoincident peak demand of 72,554 MW as of 1978.

As stated earlier, the two reliability councils, the SPP and ERCOT, are not interconnected electrically. The SPP is interconnected with other reliability councils to the north, northeast, and east, whereas ERCOT operates electrically isolated from other parts of the Nation. The two councils were organized essentially as coordinating groups to enhance power supply reliability in general accordance with recommendations made to the Federal Power Commission in June 1967 by the Advisory Committee on Reliability of Electric Bulk Power Supply. The council organizations encourage joint planning of generation and transmission, coordination of maintenance, and adequate reserves, and serve as an exchange medium for information and activities associated with bulk power supply.

In addition to the two principal regional council area organizations, several smaller electric power coordinating groups are within the region.

In the SPP area, the MSU, a holding company, is a pool consisting of five utilities with central dispatching facilities. The MOKAN Pool is a coordinated group of nine utilities in the Kansas-Missouri area without central dispatching but with energy brokering. The SCEC is a group of 11 utilities formed for the purpose of handling seasonal diversity exchanges with the TVA. The Southwestern Power Administration (SPA) is a Federal agency designated to market the hydroelectric power received from Federal projects to preference customers within the SPP and ERCOT. Two municipal organizations existing in the Kansas area are the Northwest Kansas Municipal Agency and the Eastern Kansas Municipal Agency. The Rural Electrification Administration (REA) cooperatives in Kansas are organized as the Kansas Electric Cooperatives, Inc.

In Louisiana, the Louisiana Energy and Power Authority is being formed to be available to all municipal electric systems. The Association of Louisiana Electric Cooperatives, Inc. is the representative agency for the REA cooperatives in the State.

In Missouri, the municipals are organized under the umbrella Missouri Association of Municipal Utilities. A separate group of municipals known as the Southeast Missouri-Northeast Arkansas Municipal Utilities Association (SEMO-NEARK) exists in the boot-hill area of Missouri and northeast Arkansas.

In Oklahoma, the REA cooperatives are organized under the heading of the Oklahoma Electric Cooperatives, Inc., and the municipal organization is the Municipal Electric Systems of Oklahoma (MESO).

The REA cooperatives in Arkansas are organized under the name of the Arkansas Electric Cooperatives, Inc.

The Committee on Power for the Southwest is an organization composed of some 58 municipals and 177 REA cooperatives located in Arkansas, Kansas, Louisiana, Missouri, Oklahoma, and Texas.

In the ERCOT area, several organizations have been formed to promote coordination and reliability. The TUSI and TIS are two of

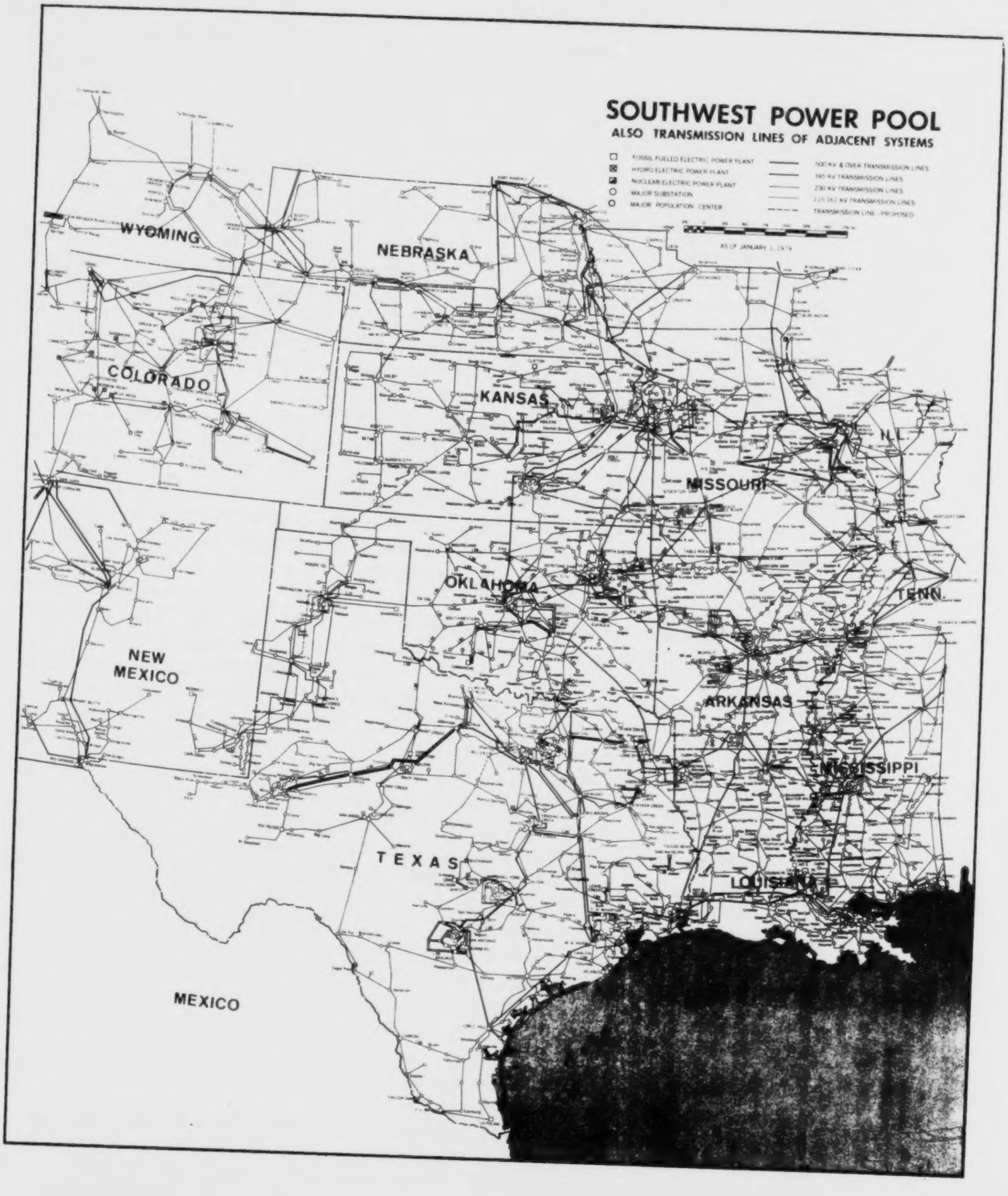
SOUTHWEST POWER POOL
ALSO TRANSMISSION LINES OF ADJACENT SYSTEMS
☐ FOSSIL FUELED ELECTRIC POWER PLANT
☒ HYDRO ELECTRIC POWER PLANT
NUCLEAR ELECTRIC POWER PLANT
○ MAJOR SUBSTATION
○ MAJOR POPULATION CENTER
500 KV & OVER TRANSMISSION LINES
345 KV TRANSMISSION LINES
230 KV TRANSMISSION LINES
115-161 KV TRANSMISSION LINES
TRANSMISSION LINE - PROPOSED
AS OF JANUARY 1, 1979
WYOMING
NEBRASKA
COLORADO
KANSAS
MISSOURI
ILL.
OKLAHOMA
TENN.
NEW MEXICO
ARKANSAS
MISSISSIPPI
TEXAS
LOUISIANA
MEXICO

FIGURE 1--Transmission Facilities of the Southwest Power Pool and Adjacent Areas

the larger coordinating organizations. The Texas Municipal Power Pool is a smaller coordinating group of four municipals and one REA generation and transmission cooperative. The REA cooperatives are organized under the name of Texas Electric Cooperatives, Inc.

REGIONAL CHARACTERISTICS AFFECTING COORDINATION AND POOLING

POPULATION AND CLIMATE

The region covers over 700,000 square miles and the current population is greater than 28 million. It is characterized by hot summers and by winters ranging from moderately severe in the northern extremities to mild in the southern portions. Rainfall and streamflows are more abundant in the southeastern and eastern portions of the region. For example, average annual rainfall varies from less than 10-11 inches in the western half of the area to 40-50 inches in the east and southeast. Major population centers and accompanying industrial complexes are located, in general, in the southeastern and eastern portions of the region and correspondingly dictate the concentration of major electric load and generation centers in those areas. The sparsity of population combined with relatively wide dispersion of small municipal trade centers in the Plains States contribute to the fact that a number of small isolated municipal electric utilities are in these areas.

ELECTRIC LOADS AND CHARACTERISTICS

The 1978 load data indicate electric utilities in the region served about 10,240,000 rural, residential, and commercial customers in addition to a heavy industrial load that totalled about 340,000 million kWh. Industrial energy requirements accounted for about 41 percent of the total regional energy load, whereas residential and commercial customers accounted for about 55 percent. The remaining 4 percent includes street lighting, irrigation, and other similar types of load. The noncoincident peak demand for the summer of 1978 was 72,554 MW and the installed capacity at that time was 94,324 MW. For the years 1974-78 inclusive, the average percentage increase of electric energy consumption in the region was about 6.5 percent per year.

Summer peakloads experienced in the region are predominantly temperature sensitive. Persistent periods of high temperature and the resultant above normal peakloads will likely occur during periods of below normal rainfall. Load conditions consisting of persistent high temperatures coincident with drought weather conditions are used to determine the capacity needed to serve the summer loads in the region. Historically, winter peakloads usually average about 70 percent of the summer peakloads. Maintenance work on generating units is performed by utilities during the winter and spring seasons. However, some systems with high load factors and large generating units find it necessary to conduct maintenance during the peakload summer months.

During heat storms, the region has experienced summer peaks resulting primarily from air conditioning loads; such loads prevail for many hours and recur on several consecutive days. A typical daily load curve may show greater than 90 percent of summer peak values for 10 or more hours and sometimes, greater than 95 percent of peak for 8 or 9 hours.

The difference in electrical load characteristics between the SPP area, which has a dominant summer peak, and the adjacent TVA area, which has a dominant winter peak, provided an opportunity for a seasonal diversity exchange between the two areas. Consequently, in 1968, 11 of the SPP companies and the TVA made a 10-year mutually beneficial contractual agreement to exchange 1500 MW on a seasonal diversity basis. The details of the SCEC Agreement are covered elsewhere in this report.

LOAD CENTERS

In the region, the location of load concentrations has played a dominant role in both the site location of generating plants and the routing of transmission lines. The large load centers in the northern sections of the region are located in Kansas, namely in the Kansas City, Wichita, and Topeka areas. In Oklahoma, the centers are in and around Oklahoma City and Tulsa. The larger centers in Texas are located around the Dallas-Fort Worth area, Amarillo, San Antonio, and Houston areas. Load centers in the eastern part of the region are at Shreveport, Baton Rouge, and New Orleans, Louisiana; Little Rock, Arkansas; and Jackson, Mississippi.

GENERATING PLANTS

The siting of powerplants in the region depends on a number of factors including location of load centers, water supply, fuel supply, availability of sites, transportation facilities, and many others. However, most powerplants are concentrated around the major load centers. (See Figure 1.) Obviously, these plants were located near load centers to minimize the need for long transmission lines and at the same time to increase area protection and reliability. Moreover, because natural gas was the principal fuel for electric power generation until recently, fuel transportation was no problem and plant locations were governed primarily by load concentration. However, as the use of natural gas is phased out in favor of coal and nuclear fuels, factors such as fuel transportation, air pollution, and safety have assumed a dominant role in powerplant site selections.

Water supply is a factor in the location and production of major electric power sources generated in the region. Hydroelectric power generation has been projected to be a minor percentage of the total energy requirement in the region, and generation by internal combustion engines and oil-fired turbines will represent only an insignificant part of the total demand. Thus, the bulk of the future power supply in this region during the foreseeable future will be from larger steam-electric generating plants and these will require a great deal of cooling water.

Most of the larger hydroelectric projects in the region are owned by the Federal Government and are located principally in Oklahoma, Arkansas, and Missouri with a few in Texas. The SPA markets the power received from Federal projects but gives preference, as dictated by law, to municipal and other publicly owned utilities in the region.

Until about 1975, more than 90 percent of known gas reserves in the United States were located in the region, and about 85 percent of the region's power generation was fueled by natural gas. However, by 1978, only about 64 percent of the total generation in the region was gas fired. Because natural gas has been relatively abundant and inexpensive, the region has utilized this fuel type to great advantage. Most utilities installed gas-fired units except for several utilities in the Kansas City area which used coal; some utilities in this particular area installed gas-fired as well as coal-fired units.

Since the decline of known gas reserves beginning in 1967, State and Federal regulatory commissions have made extensive studies regarding the future use of natural gas and, in general, have prohibited the construction of baseload generation units fired by natural gas. Furthermore, schedules for the reduction of use in existing plants have been prescribed. The latter situation has eased somewhat and a considerable amount of natural gas has become available for use during the near term. Consequently, utilities are being encouraged to use gas for generation in existing units rather than imported oil from OPEC countries.

Prior to 1967, oil for power generation was used strictly as an emergency fuel to substitute for gas during the heavy winter heating load period. As gas became scarce in the 1970's, oil became increasingly necessary for firm generation. Authorized curtailment by the Federal Power Commission of natural gas for generation became prevalent and caused more utilities to convert their gas-fired units to oil. However, the OPEC oil embargo in 1973 and 1974 reversed this trend and presented serious problems for utilities that relied on oil. Subsequent vacillation by State and Federal regulatory agencies as to the use of oil for generation has compounded these problems. The amount of generation in the region by oil-fired units, including combustion turbines and internal combustion engines, was less than 12 percent of the total generation during 1978.

The bulk of future power generation in the region will be coal, lignite, and nuclear. Gas-fired generation has decreased from about 85 percent of the total in 1975 to about 64 percent in 1978. This type of generation is presently being encouraged in favor of oil where possible, but this situation is only temporary. Hydroelectric generation and the potential for this source of generation is minimal, and oil-fired generation, except for peaking power purposes, is discouraged.

The presently predicted rate of peakload growth in the ERCOT area for 1978-88 is about 5.3 percent per year. Similarly, the predicted growth rate in the SPP area is 6.1 percent. To meet the loads, provide for reserves, and reduce gas-fired generation during this period, the ERCOT systems plan to install 18,000 MW of new generating capacity, 12,000 MW of which would be coal or lignite fired, and the remaining 6000 MW nuclear. The scheduled capacity in the SPP area is about 40,900 MW, of which 30,000 MW is coal fired and 9000 is nuclear. Thus, an additional 42,000 MW of coal-fired capacity and 15,000 MW of nuclear should be available in the entire region by 1988. Because of the present program to reduce dependence on natural gas, this amount of capacity may provide more generation reserves up to at least 1990, than required for reliability purposes alone, depending on fuel availability and load growth.

As costs of capacity and fuel have increased, utilities have joined together in some areas to construct large coal-fired and nuclear units. These joint enterprise units have served as a means of spreading the huge investments required among utilities and at the same time permitting all entities, particularly the smaller ones, to gain some fiscal benefit through the economies of scale. These fiscal benefits stem not only from the reduction in cost per kilowatt of capacity but also from the reduced fuel costs available from larger purchase contracts and from reduced operation and maintenance costs. Appendix A lists the joint ownership generating units and the participating utilities for each in the region. As listed, 29 plants and 36 owner entities are involved with a total capacity of about 35,200 MW. As an indication of the growing dominance of joint ownership, the scheduled joint-ownership capacity, 26,500 MW, equals about 39 percent of the total scheduled for the region. Also, as a matter of interest, about 29 percent of the joint-ownership capacity is nuclear with the remainder divided about equally between coal and lignite.

ELECTRIC TRANSMISSION NETWORK

The transmission facilities in the region are indicated in Figure 1. Insofar as transmission is concerned, the region is divided into two separate segments: (1) the SPP area, and (2) the intrastate ERCOT area--which do not operate in synchronism. Within these two areas, all the utilities are interconnected except for a few isolated municipal systems. Appendix B contains a listing showing the interconnections for each of the 648 utilities in the region together with other pertinent information as to peakloads, generating capacity, and source of purchased power. Of the 21 isolated systems in the region as of December 31, 1978, 16 were located in Kansas with 4 in the Texas Panhandle and eastern New Mexico areas and 1 in Oklahoma. Table 1 lists these systems.

TABLE 1--Isolated Systems in the South Central Region as of December 31, 1978

State	Utility	Installed Capacity (MW)	Utility	Installed Capacity (MW)
Kansas	Ashland	5.0	Jetmore	5.9
	Baldwin	6.1	Lincoln	9.0
	Belleville	13.1	Norton	11.3
	Burlingame	3.7	Oberlin	7.2
	Goodland	20.7	Protection	2.9
	Greensburg	7.0	St. Francis	5.8
	Hill City	7.0	Sharon Springs	3.1
	Hugoton	13.4	Wilson	5.3
New Mexico	Clayton	7.1	--	--
Oklahoma	Newkirk	5.6	--	--
Texas	Crosbyton	4.8	Tulia	15.0
	Lubbock	195.7	--	--

UTILITY OWNERSHIP PATTERNS

Appendix B lists all of the 648 electric utilities by (1) name and State in which they are located, (2) peakload and installed capacity as of 1978, (3) interconnections with other utilities, and (4) source of purchased power, if any. Information as to number and installed capacity by type of ownership is listed in Table 2.

As indicated, about 82 percent of the total installed capacity in the region is investor owned. Municipals comprise about 60 percent of the total number of utilities with some 10.5 percent of the total capacity; similarly, REA cooperatives comprise about 34 percent by number and about 3.5 percent of the capacity in the region. However, most of the municipals and cooperatives purchase power from the investor- and State-owned systems on a wholesale basis, as indicated by Appendix B.

REGULATORY PATTERNS

Each of the States in the region has established a commission to regulate electric utilities. The degree of regulation varies somewhat with respect to jurisdiction over municipals, cooperatives, and power facilities certification, but in all cases, investor-owned utilities' retail rates are jurisdictional. All of the larger utilities in the SPP operate in interstate commerce and, thus, are under the jurisdiction of FERC with respect to wholesale rates. All the utilities in ERCOT are operated wholly intrastate and FERC jurisdiction does not apply. However, West Texas Utilities Company (WETU) and Central Power and Light Company (CEPL) do file their wholesale rate contracts with FERC.

The rates charged by SPA for electric power from Federal hydroelectric projects are subject to approval by FERC, but this approval authority does not include enforcement. The Environmental Protection Agency prescribes pollution abatement regulations requiring compliance by electric utilities, and the U.S. Army Corps of Engineers regulates permits for dredging, or construction in navigable waters, or both. The Nuclear Regulatory Commission licenses the construction and operation of all nuclear reactors and associated facilities, whereas FERC licenses the construction and operation of most non-Federal hydroelectric plants. The Securities and Exchange Commission (SEC) exercises jurisdiction over utilities

TABLE 2--Number and Installed Capacity of Electric Utilities by Type of Ownership (December 31, 1978)

Type Ownership	SPP	ERCOT	Total
Investor-Owned Systems			
Number	24	8	32
Installed Capacity (MW)	43,119	33,906	77,025
Municipals			
Number	324	61	385
Installed Capacity (MW)	4,328	5,749	10,077
REA Cooperatives			
Number	157	65	222
Installed Capacity (MW)	2,658	626	3,284
State Systems			
Number	2	4	6
Installed Capacity (MW)	580	1,386	1,966
Federal Systems			
Number	1	2	3
Installed Capacity (MW)	1,875	97	1,972
Total			
Number	508	140	648
Installed Capacity (MW)	52,560	41,764	94,324

in the issuance of securities, consolidations, and accumulation of assets. The REA exercises financial control over rural electric cooperatives.

REGIONAL COORDINATION PATTERNS

Because no normally closed ties exist to utilities outside ERCOT, no coordination of actual operations occurs between ERCOT electric utilities and those in other parts of the country. However, ERCOT is a member of NERC and ERCOT members are members of other national industry organizations and, thus, a certain degree of coordination occurs with other utilities in the Nation through the exchange of information concerning operating methods, procedures during emergencies and the like. Within ERCOT, a closer degree of coordination is present between electric utilities. Information is exchanged as to maintenance outages, economy energy availability, and the scheduled construction of both transmission and generating facilities; also generating units are jointly owned and constructed. No central dispatch as such currently transpires, but security centers are maintained in both north and south Texas and coordinate operations among the bulk power suppliers.

Utilities in the SPP area are closely interconnected with each other and other peripheral utilities. The MSU, operating in Louisiana, Arkansas, and Mississippi, utilizes central dispatch and is closely coordinated in all respects. Also, a group of utilities in the SPP exchanges seasonal power with the TVA. The MOKAN Pool, operating in Missouri and Kansas, coordinates its construction and maintenance outage, etc. and has initiated a broker type system of economy energy interchange. All major utilities in the SPP practice economy interchange and, through the medium of the SPP, exchange information concerning reserves, maintenance outages, scheduled capacity, and transmission. An increasing number of joint-ownership generating units are being constructed.

CHAPTER 2
ELECTRIC COORDINATION IN THE SOUTH CENTRAL REGION

TRANSMISSION NETWORK

MAJOR AREA-TO-AREA INTERCONNECTIONS

The two segments of the South Central Region, the SPP and ERCOT, are not electrically connected and therefore do not operate in synchronism. Most of the individual electric utilities are interconnected with others except for a few isolated municipal electric systems.

In the SPP, the major transmission lines are of the 345-kV class extending from the MOKAN Pool area around Kansas City down to the Oklahoma companies. Some 750-kV transmission lines are planned in the central Oklahoma area. In the Louisiana, Arkansas, and Mississippi areas, 500-kV transmission lines extend from the TVA area down through Mississippi to the southern part of Louisiana and then westward to Beaumont, Texas; from Beaumont, these lines extend northward to southern Arkansas and connect with a looped 500-kV transmission system from the Jackson, Mississippi, area. The 500-kV line extends to the Oklahoma boundary where it is transformed to 345-kV as it enters the State and connects with the 345-kV system in Oklahoma. The area around Amarillo, Texas, south and west toward Hobbs, New Mexico, is dominated by a 230-kV transmission system with 69-kV and 115-kV transmission lines permeating the area.

The SPP is interconnected with adjacent areas of the Mid-Continent Area Reliability Coordintion Agreement (MARCA), Mid-America Interpool Network (MAIN), and the Southeastern Electric Reliability Council (SERC). Between SPP and MAIN, strong 345-kV interconnections link the Kansas City Power and Light Company with the Union Electric Company as well as connecting the Kansas Gas and Electric Company with the Union Electric Company. Between SPP and MARCA, several 345-kV transmission lines interconnect the Kansas City Power and Light Company with the Nebraska Public Power District and the Iowa Power and Light Company. These various interconnections make it possible to transfer fairly large blocks of power between the systems. Between SPP and SERC, a basic 500-kV transmission system is constructed between Mississippi Power and Light Company and the TVA and between Arkansas Power and Light Company and the TVA. This was built for the primary purpose of exchanging seasonal diversity between the TVA and the SPP companies.

In the ERCOT area, the dominant network consists of a 345-kV system stretching from the Dallas-Fort Worth Area westward to the Midland-Odessa complex and southward through central Texas to San

Antonio and Corpus Christi. A 345-kV loop is formed between Corpus Christi-Houston and back to the Dallas-Fort Worth area. Lignite and nuclear plant development in eastern and southern Texas has resulted in several branches of double circuit 345-kV transmission lines, that connect to the basic 345-kV network. Because the region is electrically isolated from the rest of the Nation, no interregional transfers of power from ERCOT occur.

The transmission networks in the region have evolved rather naturally with the lower voltage system being overbuilt with higher voltage lines to carry the increased loads. Thus, the lower voltage 69-kV and 115-kV lines have become more or less distribution lines between major substations. As it became necessary and economical to transfer increasingly larger blocks of power over longer distances, the 345/500-kV transmission lines were constructed.

Figures 2 and 3 indicate the major transmission facilities as of 1949 and 1977, respectively, depicting the growth evolution of the region's transmission lines.

AMOUNTS AND VOLTAGE LEVELS

The 69-kV to 500-kV transmission lines constructed through 1978 in SPP totalled over 42,000 circuit miles. In the 1979-88 period, the SPP have planned for the installation of over 70 new generating units. This will entail the construction of 8290 miles of new transmission lines. Of this total, 2405 circuit miles will be in the 230-kV class, 4162 circuit miles in the 345-kV class, and 1271 circuit miles in the 500-kV class. The remaining circuit mileage of transmission lines will be in the 69-kV and 115-kV classes.

In the ERCOT area, additional 345-kV lines are scheduled to be constructed between 1979 and 1988 in the amount of 3200 circuit miles, bringing the total to approximately 7095 circuit miles of 345-kV for the area. This EHV system is supported by a well-integrated 138-kV system. The new EHV lines will be needed to deliver power from 18,000 MW of new capacity required by 1988 to meet future energy requirements.

POWER TRANSFER CAPABILITIES

Power transfer capabilities estimated from the 1979 summer peak season indicate that the SPP would transfer 1200 MW to MARCA, 2000 MW to MAIN, and 3500 MW to SERC. At the same peak season, MARCA could transfer 700 MW to SPP, 1500 MW from MAIN to SPP, and 2900 MW from SERC to the SPP. Because ERCOT is isolated from the other utilities in the Nation, regional transfers of power in or out of the area are not possible.

CONTROL AREAS

FUNCTIONS

All of the 29 control centers in the region monitor their own generating stations and operating centers and also monitor their neighbor's plants. This procedure provides adequate communication and information in the event of a failure of either generating units, transmission systems or both. Transfers of power between the various utilities are handled by the dispatchers in the control centers, usually on an hourly or daily basis. Loadings on transmission lines are continually monitored by the control center personnel to ensure that these loadings are within safe operating limits.

Suitable instrumentation must be installed in each control center to measure and monitor appropriate loadings at key points in their own utility system and have suitable alarms to alert operating personnel in case of any overloads or impending damage to their system. Automatic oscillographs with prefault capability are installed at appropriate points within the region so that outages and short circuits can be analyzed and protective relay performances studied.

DIFFERENCES BETWEEN CONTROL CENTERS

Basically, control center functions are about the same for all the utilities in the region. In the SPP, the control center for MSU, consisting of five companies, operates from a central location at Pine Bluff, Arkansas. This center has economic dispatching and controls the major transmission system for the five utilities.

In addition to control centers, two security centers are in the ERCOT area. One is located at the Lower Colorado River Authority's facilities in Austin, Texas and serves the southern group of TIS utilities. The other is located in the Texas Utilities Generating Company's office in Dallas, Texas and serves the northern group of TIS utilities. These centers are responsible for ensuring that the utilities maintain the proper amount of spinning reserves for each of the north and south groups. This reserve is equal to the capability of the largest unit in operation plus 100 MW for each of the areas. The personnel of the security centers also man the control centers, which in effect gives the control center personnel in those two security centers additional operating responsibilities.

LOCATION OF CONTROL CENTERS

Figure 4 shows the location and utility companies represented in each control center in the region. In the SPP area, 22 separate control areas are located principally in the central part of each utility's service area. In the ERCOT area, eight control centers are located in or near the center of their respective utility areas.

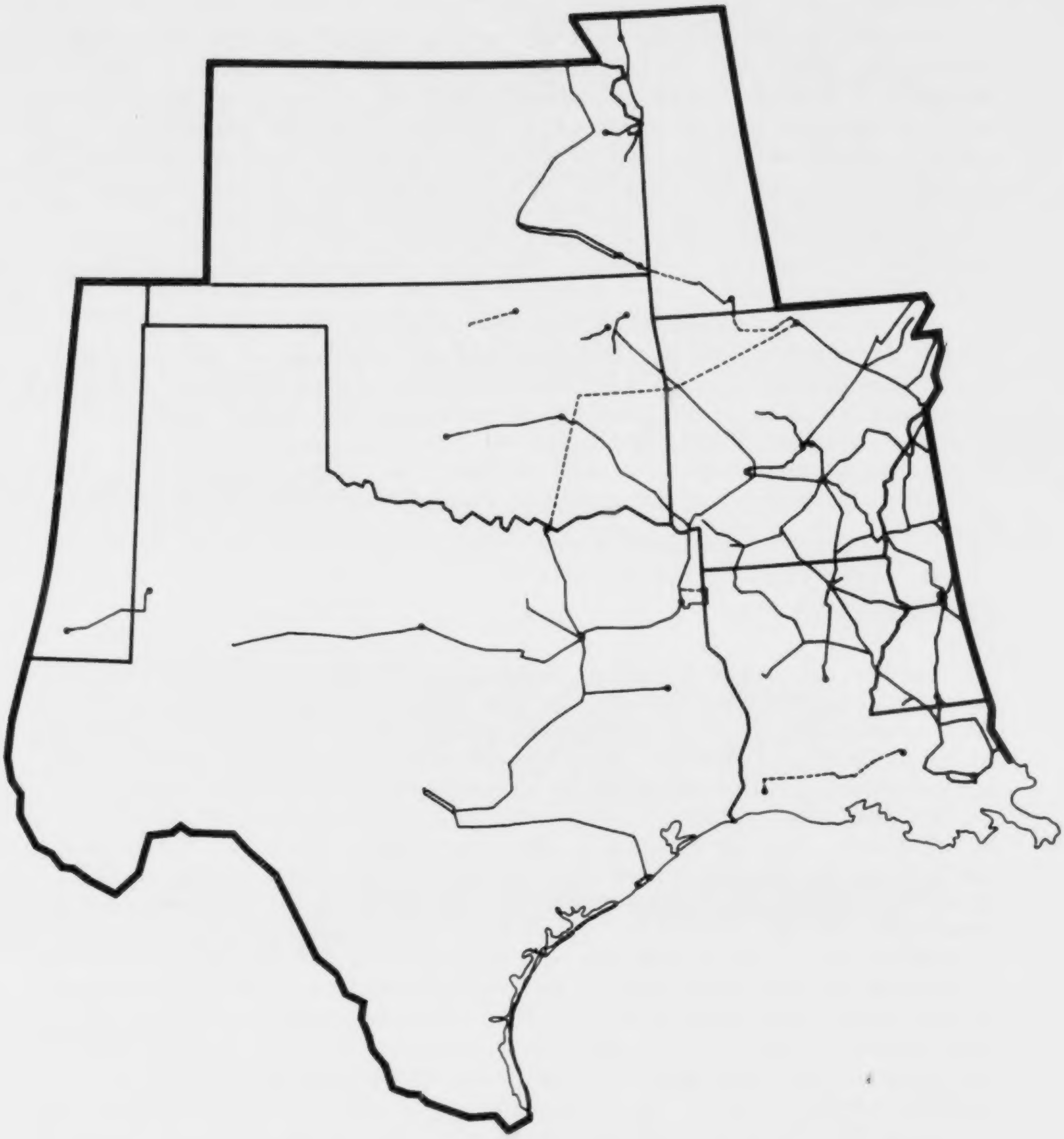

FIGURE 2--Major Transmission Facilities as of 1949

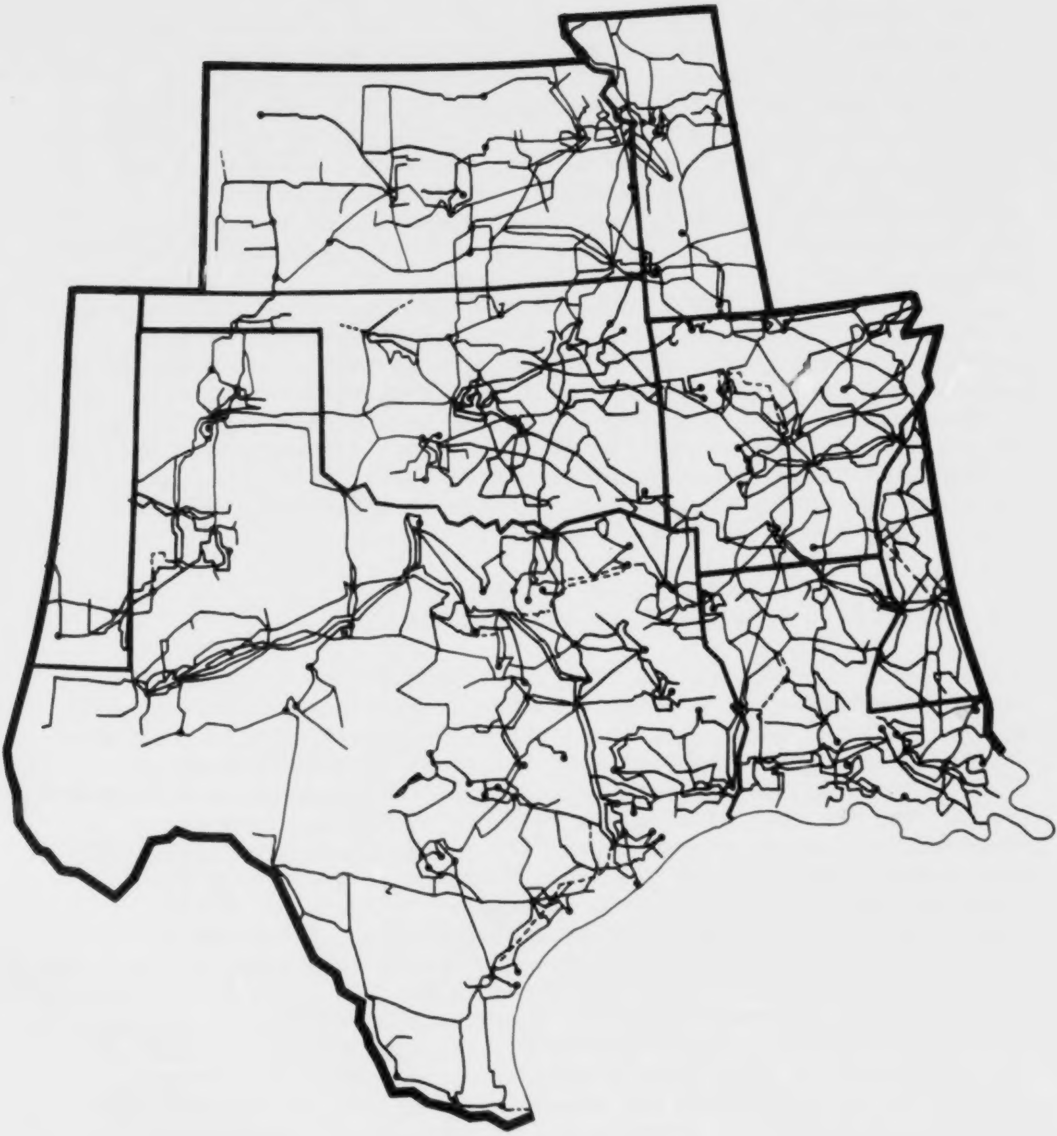

FIGURE 3--Major Transmission Facilities as of 1977

RELIABILITY COUNCILS

FUNCTIONS

The SPP Reliability Council, through its coordination committee, functions as a group that adopts practices for systems operation that will help to ensure reliable bulk power supply among the various systems of the SPP. The function of this council is very similar to the other regional councils in the United States in that it is a voluntary coordinating organization for the region. The coordinating committee gives careful consideration to the recommendations of those systems whose planning and operation can have a major effect on the reliability of the overall bulk electric power supply of the region.

The functions of ERCOT are somewhat different from the functions of other councils because most of the planning and studies are performed on and by TIS, which had been in existence for at least 25 years before ERCOT was formed. Of the 86 utilities in ERCOT, 9 are in the original TIS group, which provides most of the capacity and transmission facilities for the ERCOT region.. Through the function of the ERCOT Technical Advisory Committee (TAC), ERCOT adopts practices for system operations that help to ensure reliable bulk power supply among the members of ERCOT.

HOW RELIABILITY COORDINATION IS ACCOMPLISHED

Reliability coordination is accomplished in the SPP because each member is obligated to cooperate in the development of plans that may generally be acceptable. The SPP council continues coordination of its efforts with the efforts of the South Central Systems of NAPSIC, formerly the Regional Committee of the Interregional Systems Group. The SPP also studies the members' operating plans and problems that are pertinent to the SPP Coordinating Agreement. It also suggests matters for study by the members, especially load flows and capacity studies, and it reviews the results of all studies submitted to the coordination committee. Also, the SPP studies the reliability of the bulk electric power supply of the region, makes use of studies conducted by the SCEC, MOKAN, and any other group within the region and conducts such additional studies as it deems necessary or desirable to determine the reliability of the bulk electric power supply under various assumed conditions.

The SPP also develops and recommends, through the coordination committee, reliability criteria for intraregional planning and encourages the adoption of the reliability criteria for interregional planning. It studies the intraregional plans submitted by the four coordinating groups with SPP and recommends planning between intraregional groups. The SPP also develops a coordinated plan for intraregional transmission for greater reliability of bulk electric power supply and recommends to the members either individual or joint action to improve the operation of the systems comprising the SPP.

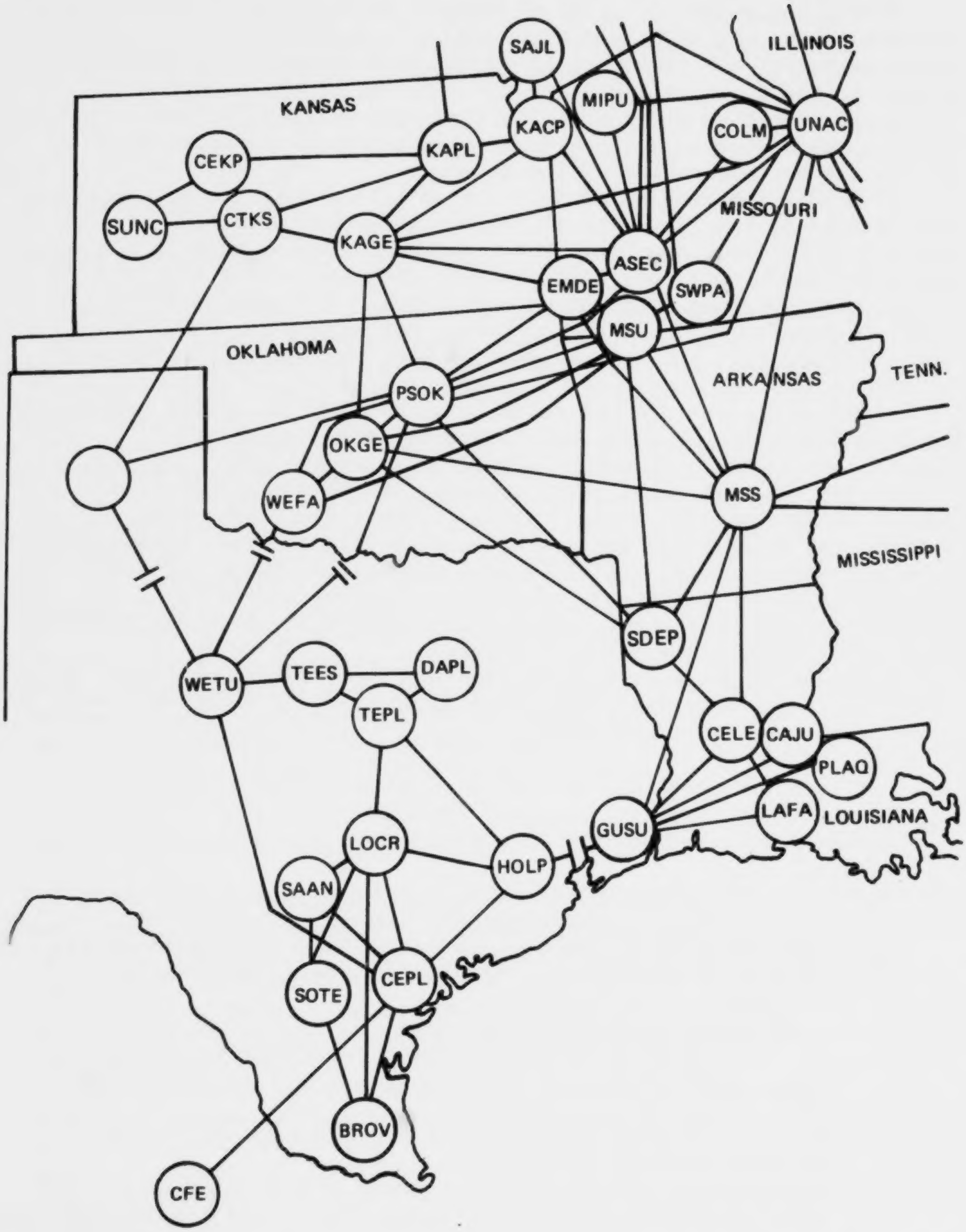
SAJL
ILLINOIS
KANSAS
MIPU
KACP
COLM
UNAC
CEKP
KAPL
SUNC
CTKS
KAGE
MISSOURI
ASEC
EMDE
SWPA
MSU
OKLAHOMA
ARKANSAS
TENN.
PSOK
OKGE
WEFA
MSS
MISSISSIPPI
SDEP
WETU
TEES
DAPL
TEPL
CELE
CAJU
PLAQ
LAFA
LOUISIANA
GUSU
LOCR
HOLP
SAAN
CEPL
SOTE
BROV
CFE

FIGURE 4--Control Centers

Should any member or group of members having more than 15 percent of the voting strength not agree to the plans for coordination of SPP region by the coordination committee, they may appeal to the board of directors for a review of the committee's plans and submit an alternate plan for consideration. After decision as to action by the board, each member is expected to follow the recommendation of the board.

In ERCOT, the studies of both reliability and system adequacy are handled by the TAC. The ERCOT-TAC cooperates with NERC on matters of national concern. Additional committees, task forces and special study groups, are formed to evaluate activities necessary to maintain all systems coordinated operations. The permanent staff of ERCOT is located in San Antonio, Texas, and serves the ERCOT Board and its committees and acts as liaison with the administration staff of NERC.

Loadflow studies are run annually in ERCOT to establish base cases from which contingency cases are designed to test the performance of the bulk supply system under severe operating conditions. A major portion of these contingency cases involve sudden outages of generation. Although these cases cannot be regarded as substitutes for transient stability studies, they have been proven to be very useful in determining performance of the system during the new steady state period before automatic generation equipment has restored the system to the predisturbance status, or as near thereto as possible.

Because TIS conducts most of the bulk power system planning for ERCOT to ascertain reliability coordination, specific criteria have been adopted by TIS as follows:

1. Sufficient generating capacity will be provided, as nearly as practical, to ensure a capacity reserve of at least 15 percent of the forecasted maximum hour peak demand of the interconnected system
2. Projected TIS planning will include simulated testing to ensure that the system will not experience cascading breakup and collapse initiated by the occurrences of such contingencies as:
   - o Loss of all generating capacity at any one generating station
   - o Loss of any two generating units
   - o Outage of any circuit or generating unit during scheduled maintenance on any other transmission line or generating unit
   - o Outage of a single or double circuit transmission line, generating unit, transformer or bus
   - o Simultaneous outage of two overhead transmission lines that are constructed parallel to each other and have a spacing between pole lines of less than the height of the structures
   - o Any fault cleared by normal operation of backup relays
   - o Loss of any large load or concentrated load area

Although these criteria established minimum conditions of acceptable reliability coordination, ERCOT is also capable of withstanding many contingencies more severe than those listed. This conclusion is based upon results from actual system disturbances during the past decade and on a large number of system studies conducted during that time.

COORDINATION FOR ECONOMY

FORMAL POOLS

Middle South Utilitites, Inc. (MSU)

MSU is a public-utility holding company with membership as follows: Arkansas Power and Light Company, Mississippi Power and Light Company, Arkansas-Missouri Power Company, Louisiana Power and Light Company and New Orleans Public Service Company, Inc.

The member companies first began their planning and electric operations by exchanging power and energy through service schedules. In the 1960's, system agreements were executed that provided for fully coordinated planning reserve sharing and construction of capacity additions and transmission facilities for bulk power supply. In 1979, MSU increased its minimum reserve from 15 to 16 percent. The ready reserve policy remains at 6 percent of the peakload; one-half of the ready reserve is spinning reserve, which is connected to the bus and ready to take load automatically by prime mover governor action. Three percent of the ready reserve can be capacity that is fully operational in 10 minutes or less. MSU operates a central dispatch center located at Pine Bluff, Arkansas.

Texas Utilities Company System (TUSI)

Dallas Power and Light Company, Texas Electric Service Company, and Texas Power and Light Company are the three operating companies of TUSI. Other subsidiaries of TUSI provide engineering, construction, financial services and acquire store and transport natural gas and fuel oil for the operating utilities. The Texas Utilities Generating Company operates the jointly owned generating stations.

The installed generating capacity programs of the three operating companies are coordinated, installing the largest economical units available. With the shift away from natural gas as a boiler fuel, TUSI has switched to lignite and nuclear fuels. This shift to these fuels has led to joint ownership of powerplants by the three operating companies.

TUSI's operating utilities have adopted an agreed level of installed and spinning reserve with a minimum installed reserve requirement of 15 percent above the expected annual peakload. With the installation of the large coal-fired and nuclear units, this reserve criterion is being studied to determine if it is adequate for sound reliability and economical operation.

Jointly owned units are dispatched through a common control center as well as being coordinated with the main control center of each operating utility. Planning is underway for a central dispatch center that would entail unit commitment, provide fuel management, and include accounting functions for TUSI.

Missouri-Kansas (MOKAN) Pool

Formulation of the MOKAN Pool began in 1959 by five electric utilities operating in western Missouri and eastern Kansas. The five participants were as follows: Kansas City Power and Light Company, Missouri Public Service Company, Empire District Electric Company, Kansas Power and Light Comany, and Kansas Gas and Electric Company. Central Telephone and Utilities Corporation and Central Kansas Power Company became members of the pool in 1970. Sunflower Electric Cooperative, Inc. and St. Joseph Light and Power Company joined in 1977 and 1979, respectively.

In the 1960's the interconnections allowed the interchange of firm power, emergency energy, and economy energy service on a limited scale. The early interconnections did not allow the sharing of reserve capacity because of size limitation. In 1962, the five basic companies signed a coordination agreement to build 161-kV interconnections to increase the interchange capability between systems. This enabled the companies to share reserve generating capacity with each other. As a means of reducing their reserve capacity requirements, a 345-kV transmission system and associated interconnections were started in 1965 between the companies and with other utilities in Missouri and Kansas. Nearly $40 million was invested in these EHV facilities by the end of 1969.

MOKAN does not have central dispatch. Past engineering studies indicated that the economics did not justify a central dispatch system. However, an energy "brokerage" type system was implemented on March 3, 1980, for the purpose of distribution of economy energy among the pool members.

South Central Electric Companies (SCEC)

SCEC is an association of 11 privately owned electric companies operating in Arkansas, Kansas, Louisiana, Missouri, Mississippi, Oklahoma, and Texas. In 1964, the 11 companies signed a coordination agreement with the TVA for the exchange of seasonal load diversity. The 11 companies and the TVA assumed the responsibility for installation, ownership, operation, and the maintenance of EHV facilities that were necessary to implement the diversity interchange. The amount of capacity exchanged has varied up to a maximum of 1500 MW.

An operations center was established at Little Rock, Arkansas, to carry out the commitments of the several interconnection agreements covering the coordination between the participants. The 1500-MW diversity exchange required the construction of about 940 miles of 500-kV and 200 miles of 345-kV lines, which provided a very strong transmission system in the south central portion of the United States.

In October 1975, the SCEC phased out the coordination center in Little Rock and transferred all scheduling to the MUS control center in Pine Bluff, Arkansas. Reportedly the diversity interchange will be gradually phased out because of changing load characteristics on the TVA system.

Central and South West Corporation (CSW)

The CSW is a public-utility holding company that coordinates the operation of four electric utilities located in the South Central Region. The four operating companies are Southwestern Electric Power Company (SOEP), Public Service Comany of Oklahoma (PSOK), WETU, and CEPL. The two companies that operate in south and west Texas, CEPL and WETU, are a part of ERCOT. The two other companies, SOEP and PSOK which operate in Oklahoma, northwest Louisiana, western Arkansas, and northeast Texas, are members of the SPP.

The CSW through its Central and South West Services, Inc., subsidiary company coordinates the planning, financing, and construction of the generating capacity additions and transmission lines for bulk power supply for the operating utilities. Each company maintains its own dispatch center with the intrastate companies, CEPL and WETU, exchanging economy energy and the interstate companies, PSOK and SOEP, also making economy energy exchanges between their respective companies. Each company adheres to the reserve policy in its respective reliability council area.

Studies were initiated in late 1974 to determine the most economical and proper electrical expansion of the four operating companies of the CSW with an objective of interconnecting the four companies. Additional studies have been made to determine the best interconnected plan for tieing the four individual companies together as well as a plan to interconnect ERCOT and the SPP. Some of the member systems of ERCOT initially opposed the interconnection of the CSW's Texas systems to other CSW utilities in the SPP, which would serve to interconnect the two council areas. This matter was brought to the courts and the appropriate regulatory agencies. New engineering studies of the interconnections are now underway.

Texas Municipal Power Pool (TMPP)

TMPP was originally formed in 1963 by the cities of Bryan, Garland, and Greenville, along with the Brazos Electric Power Cooperative (BREP). In 1969, the city of Denton became the fifth member. The pool agreement established management procedures and provided for coordination of capacity and spinning reserve, as well as for the purchase and sale of supplemental, maintenance, and emergency energy.

Original TMPP studies indicated the present fixed-cost savings would amount to approximately $8.5 million during the first 10 years of operation. Recent cost comparisons completed by the TMPP staff has confirmed those estimates as reasonable.

INFORMAL POOLING

Texas Municipal Power Agency (TMPA)

The cities of Bryan, Garland, Greenville, and Denton formed TMPA in 1975. This allowed the cities to finance the building of bulk power sources outside their respective service area boundaries. Accordingly, a 400-MW steam-electric generating plant to be fueled by lignite is under construction in Grimes County, near Bryan, Texas. Also, TMPA has executed an agreement with the operating companies of TUSI for joint ownership in the Comanche Peak Nuclear Plant which is now under construction and has purchased a 6.2-percent interest in the plant. Finally, the agency provided administrative support for the members economic dispatch operations. Centralized economic dispatch for TMPA is planned for early 1981.

SEMO-NEARK Municipal Utilities Association (SEMO-NEARK)

SEMO-NEARK is a coordinating group of cities located in southeastern Missouri and northeastern Arkansas. Most of these cities relied on natural gas and fuel oil for their generating plants. As the problems of supply and rising cost of fuels developed in the seventies, the organization directed their studies and planning toward a coal-fired station. The city of Sikeston, Missouri, is now building a 200-MW coal-fired unit for service in 1981. The output will be shared among association members.

In addition, SPA hydroelectric peaking power makes up part of the power supply for members. Since 1975, SPA has not been able to furnish additional capacity to the members. The association has helped to arrange additional power supply from neighboring utilities to meet system growth.

Northwest Kansas Power Agency (NWKPA)

NWKPA was formed in 1972 to arrange future power supply and interconnections for 14 municipals located in northwest Kansas. A majority of these cities were electrically isolated at that time. In 1977, legislation was passed that allowed municipals in Kansas to form energy agencies for the purpose of financing and participating in power supply sources beyond their service area boundaries. Since that time, 9 of the original 14 municipal electric systems in NWKPA have formed the Northwest Kansas Municipal Energy Agency (NKMEA). Studies are underway to determine the costs and benefits for NKMEA to participate in joint ownership of new coal-fired plants in Kansas and associated transmission facilities.

Eastern Kansas Municipal Energy Agency (EKMEA)

EKMEA consisted of 18 municipal electric utilities located in eastern Kansas. The agency was formed following passage of the 1977 permissive State legislation. EKMEA members contracted for a consulting engineer to make a power supply and energy requirements study for the member system; the study was completed in November 1979.

In January 1980, members of NKMEA and representatives of EKMEA merged into one agency that was named the Kansas Municipal Energy Agency (KMEA). Thirty members currently belong to KMEA and three additional city governments have approved joining the group. The merger of the two agencies will eventually allow 35 of the States' 64 municipal electric systems to be involved in joint action power supply planning for future energy needs.

Prior to the merger, NKMEA received an offer from an investor-owned utility to allow agency ownership in two of the utility's future powerplants. This offer of plant ownership has spurred an interest of municipals in the southwest and south central part of Kansas to become members of KMEA and to participate in studies evaluating the investor-owned utilities offer.

Municipal Electric Systems of Oklahoma (MESO)

The municipal systems in Oklahoma officially formed MESO in January 1978. This organization started with 16 municipals as members and now has 47. The organization provides the members with such varied services as assistance in obtaining power contracts, wheeling agreements, and supporting legislation to allow joint ownership and financing of facilities.

Committee on Power for the Southwest (CPSW)

The CPSW consists of 177 rural electric cooperatives, 58 municipal electric utility systems that are full members, and 13 associate member systems. The member utilities are located throughout six States in the region, and the CPSW offices are located in Tulsa, Oklahoma. The CPSW is directing its activities toward programs that will provide adequate power supplies to the preference customers in the area. This is accomplished by participating in national, regional, and State issues affecting energy resources available to its members.

Cooperative Associations

Electric cooperative organizations exist in each State of the region. Membership is composed of rural distribution as well as generation and transmission cooperatives. Some of these State organizations conduct and coordinate power supply and requirement studies. Assistance is provided in arranging for power supply sources for its members. In Kansas, the State agency has arranged for and purchased a 17-percent interest in the Wolf Creek Nuclear Station (1120-MW), which is being constructed by the Kansas Gas and Electric Company and the Kansas City Power and Light Company. Other functions of the State organizations include training programs on the electrical utility operations, electrical equipment purchases, lobbying and political action, and other items pertaining to operations of rural cooperatives.

Texas Interconnected System (TIS)

TIS is an interconnected organization of bulk power systems and was officially organized in 1967. It was divided into the North Texas Group and the South Texas Group. A 345-kV transmission line was constructed in 1962 that tied the Houston area to the Dallas-Fort Worth area and thus strengthened the tie between the two groups. The coordination of reserve sharing, emergency power, and economy energy interchange are some of the benefits of this interconnected operation. Security centers are located in Dallas and Austin, Texas. The centers provide system surveillance and operating information for the utilities.

BILATERAL ARRANGEMENTS

Two of the major objectives of transmission and generation agreements of the formal and informal pools are (1) to exchange power and energy on a regional and interregional scale, and (2) to gain reductions in capacity investment and in the cost of energy production. Economy energy exchanges are handled on both a company-by-company basis and as in the case of the TVA and SCEC, as pool arrangements. Some of the pool agreements provide the formulas to calculate prices and determine how the savings are to be shared with each participating member.

The individual companies choose when to make economy energy sales and purchases. Their system dispatchers control the power and energy exchanges on the basis of hour-by-hour agreements. A contract path from company to company must exist for economy energy exchanges to take place. This requirement nearly precludes economy energy exchanges among systems that are not directly interconnected with each other. MOKAN has recently implemented a "brokerage economy interchange." This will give the members increased opportunities for economy energy exchanges.

CEPL and WETU report that their working agreement on exchanging power on an economical basis has been beneficial for both companies. Since 1973, CEPL and WETU have exchanged 2,904,183 MWh resulting in a $4,436,290 savings in energy costs for CEPL and a corresponding savings to WETU.

Replacement costs of fuels and quantity of fuels has restricted the economy energy interchanges in some areas during the latter half of the 1970's. Another possible impediment to economy energy exchanges is that the State regulatory commissions require that utilities must pass on to the consumer all of the savings resulting from economy energy exchanges. With the time lag in recovering fuel adjustments, a company may experience periods in which financial losses could occur as a result of engaging in economy energy exchanges. The SPP office has a study underway to determine the scope of utility participation, procedures, and the amounts of economy energy exchanges in the SPP area.

The ownership of major generating plants and transmission facilities is accomplished through contracts between individial companies. In MSU and TUSI, joint plant ownership is coordinated through their holding company subsidiaries; these subsidiaries have actual control over planning, engineering, construction, and financing of powerplant production and transmission facilities. A listing of joint ownership plants is given in Appendix A.

In the coordinating pools, transmission line studies and planning are directed by the operating committees, and the individual companies are responsible for the construction and maintenance of interconnecting transmission lines. For interconnections between companies that are not part of pool planning, each company is responsible for the facilities in their respective service area. In some interconnection agreements between municipals and investor-owned utilities, the investor-owned company has provided all the interconnection facilities. The cost is then repaid by the municipal on a monthly or annual basis or through the purchase of a stipulated amount of capacity and energy.

INFLUENCE OF REGULATORY BODIES

State regulators have a profound influence on all phases of utility operations within their jurisdiction including coordination. Regulators are required by State law to promote adequate, economical, and reliable electric service. Regulators can encourage utilities to form operating pools with other utilities provided that economy and reliability does not suffer at the expense of this combined operation. The regulatory control of retail rates that the utilities charge the rate payer demonstrates fully how the regulators can provide the impetus for economy in the operating costs of the individual utility. Retail rates within a single State should be very comparable in cost unless the particular utility in question is either utilizing a cheaper fuel or has a contract advantage in the price of the fuel mix.

Federal regulators influence economy of operations in their role of controlling interstate bulk power operations. The Federal Power Act, enacted in 1935, had a great influence on economy of electric power operations. The FPC encouraged voluntary interconnections and coordinating of facilities for the generation, transmission, and sale of electric energy. All this has had the effect of producing economy in the pricing of electric energy to the ultimate customer.

The passage of the Power Plant and Industrial Fuel Use Act of 1978 resulted from the oil embargo by OPEC countries and is a recent Federal regulatory act that affects the economy and coordination. This Act, has some effect on the decreasing dependence on petroleum and natural gas and resulted in some conversions in the region, especially in the industrial sector. Other congressional action is underway now to encourage more utilities to convert from gas and oil-fired operation to coal-fired generation. In this region, the most practical solution to this problem is to build new coal or nuclear plants and utilize the existing gas-fired plants for intermediate and peaking generation.

The Public Utility Regulatory Policies Act of 1978 (PURPA) has as one of its main purposes "the optimization of the efficiency of use of facilities and resources by electric utilities." The Federal Power Act was amended to promote more interconnections, to enhance wheeling between the utilities, and to exempt utilities from provisions of State laws prohibiting pooling. PURPA includes provisions to encourage cogeneration between industrial plants and major utilities and also to eliminate impediments to the combined operation of these entities.

The Nuclear Regulatory Commission and the Environmental Protection Agency have a direct and substantial influence on increasing the costs of constructing new nuclear and coal-fired plants and transmission lines. The costs of these new facilities determine the future electric rates to the ultimate consumer.

Other coordinating mechanisms in the region involve participation in Regional Reliability Council Meetings, held annually by ERCOT and the SPP. Each of these organizations have standing committees that convene periodically during the year to confer on the many facets of utility operations. The chairmen of the SPP and ERCOT, or their appointees, are representatives on the Board of the National Electric Reliability Council. Many utilities are active participants in research in the electric utility field conducted by colleges and universities in their respective States. The Electric Power Research Institute, Institute of Electrical and Electronic Engineers, American Public Power Association, Kansas Municipal Utilities, and Missouri Association of Municipal Utilities are examples of a few of the many professional organizations in which the area utilities participate.

CHAPTER 3
RELIABILITY COUNCILS AS COORDINATING ORGANIZATIONS

THE SOUTHWEST POWER POOL (SPP)

COMPOSITION

The SPP is composed of electric utility systems located in Arkansas, Kansas, Louisiana, Mississippi, Missouri, New Mexico, Oklahoma, and Texas. (See Figure 1.) The owner of an electric utility system in the southwest region may be admitted to membership in the SPP by making application to a board of directors. The "owner of an electric utility system" is defined as any entity, corporate or otherwise (including the Federal Government), federally owned or financed systems, State or municipal, or any other Government owned or financed systems, that owns, controls, and operates an electric utility system consisting of facilities for the generation, transmission, or distribution of electric power and energy to customers. In addition, the system must have at least one interconnection at transmission voltage covered by an agreement with another member of the SPP.

Current SPP membership is composed of 41 electric systems. These are divided into the following SPP planning groups:

Group A

Arkansas Electric Cooperative Corporation
Central Louisiana Electric Company, Inc.
Gulf States Utilities Company
Middle South Utilities Inc.
  Arkansas-Missouri Power Company
  Arkansas Power and Light Company
  Louisiana Power and Light Company
  Mississippi Power and Light Company
  New Orleans Public Service Inc.
City of Lafayette, La.
Cajun Electric Cooperative
City of Alexander, La.
City of Greenwood, Miss.
City of Clarksdale, Miss.
City of Ruston, La.

Group B

- Grand River Dam Authority
- Oklahoma Gas and Electric Company
- Public Service Company of Oklahoma
- Southwestern Electric Power Company
- Southwestern Power Administration
- Southwestern Public Service Company
- Western Farmers Electric Cooperative
- West Texas Utilities Company (also a member of ERCOT)

Group C

- Board of Public Utilities of Kansas City, Kansas
- Central Kansas Power Company
- Chanute, Kansas, Municipal Utilities
- Coffeyville Municipal Water and Light
- City Power and Light of Independence, Mo.
- City of Winfield, Kansas
- Kansas City Power and Light Company
- Kansas Gas and Electric Company
- Kansas Power and Light Company
- Missouri Public Service Company
- Empire District Electric Company
- St. Joseph Light and Power Company
- Western Power Division of Central Telephone and Utilities
- Sunflower Electric Cooperative, Inc.

Group D

- Associated Electric Cooperative, Inc.
- Missouri Utilities Company (also a member of MAIN)
- Missouri Edison Company (also a member of MAIN)
- Missouri Power and Light Company (also a member of MAIN)
- City Utilities of Springfield, Mo.

HISTORY

The SPP originated in the summer of 1941 after the Government announced the first phase of the Aluminum Expansion Program and its tentative decision to locate an aluminum reduction plant near bauxite deposits in Arkansas.

The Government and defense agencies estimated the power requirements for the proposed reduction plant in quantities of 65,000 kW. However, the top requirements for power supply to four pot lines in Arkansas and the Southwest totaled 120,000 kW.

Previously, Arkansas and the surrounding southern States were primarily devoted to agriculture and the total power installed in Arkansas was about 100,000 kW. A block of power totaling 120,000 kW was beyond the ability of the Arkansas Power and Light Company without the construction of major new plants. Furthermore, to build such a plant, both construction time and space in manufacturers' assembly lines to produce such equipment were required and neither were available; thus, it was readily acknowledged that major construction of this character had to be avoided whenever and wherever possible to conserve critical materials.

The executives of the power systems in southwest areas recognized early that the problems of power supply to war industries and its resultant effect on the power supply for civilian requirements was a joint responsibility. Therefore, in June of 1941 they conceived the plan of pooling production and transmission facilities in the Southwest as the most economical means of both providing and ensuring an adequate and continuous power supply for any defense industries the Government wanted to locate in this area, in addition to taking care of local civilian needs.

Power pooling, however, was not a new idea to this area. In fact, the practices and advantages had been established by utility industries throughout the United States for a number of years. In 1941, companies operating in Arkansas, Louisiana, and Mississippi, the MSU, known then as the ALM System, had been functioning as a unit for many years and were interconnected and exchanging power with the TVA to the east and with Gulf States Utilities Company and Southwestern Electric Power Company to the west. Likewise, the systems in Oklahoma were interconnected and operating in parallel with Kansas Gas and Electric Company which in turn was operating interconnected with the then Nebraska Power Company (now the Omaha Public Power District); this interconnected system operated through a 275-mile, 154-kV line extending from Midian Substation in southeast Kansas to Omaha, Nebraska. The Oklahoma companies were also interconnected with Southwestern Electric Power Company through a 138-kV line extending from Weleetka, Oklahoma, to Ashdown in southwest Arkansas.

The North Texas Systems were an interconnected unit tied in with the interlinked systems of south Texas and the Lower Colorado River Authority. To pool the production and transmission facilities in this southwest area required strengthening the ties between the smaller pools, reaching equitable interchange agreements, and setting up an organization to operate the major pool. The end result was the formation of the SPP.

The Aluminum Plant (Jones Mill) was finally located by Defense Plant Corporation at Lake Catherine between Hot Springs and Malvern, Arkansas, with four pot lines installed. The final arrangement for power supply was that two of the lines would be supplied from a powerplant consisting of gas-diesel driven direct-current generators constructed with the project. Power for the remaining two pot lines, and for auxiliaries, was contracted for in two blocks:

- A 32,000-kW block supplied by Ark La Cooperative (REA), who in turn purchased the power from Grand River Dam Authority in eastern Oklahoma; to supply this power, the Ark La Cooperative built a 154-kV line from Markham Ferry in eastern Oklahoma to the Lake Catherine location of Jones Mill Aluminum Plant, a distance of 193 miles
- A block of 65,000 kW purchased from the Arkansas Power and Light Company, which contracted with nine other investor-owned systems in the Southwest, i.e., the SPP

When the 65,000-kW contract was awarded, 10 power companies concluded their negotiations in the forming of an intercompany agreement and the SPP. The original 10 companies in the pool were:

Arkansas Power and Light Co.
Louisiana Power and Light Co.
Mississippi Power and Light Co.
Southwestern Gas and Electric Co. (now Southwestern Electric Power Co.)
Public Service Company of Oklahoma
Southwestern Light and Power Co.
Oklahoma Gas and Electric Co.
Kansas Gas & Electric Co.
Nebraska Power Co. (now Omaha Public Power District)
Texas Power & Light Co.

Most systems in this southwest region west of the Mississippi River were interconnected, making a vast network of systems then known as the Interconnected Power Systems in Southwest United States. Presently, because of their desire to retain their "intrastate" status, the systems operating in Texas (other than Gulf States Utilities Company, Southwestern Public Service Company, and Southwestern Electric Power Company) are no longer operating interconnected with the SPP. (During World War II, the Texas systems operated with the SPP through special exemption from the FPC; and some ties still exist, normally open.)

The original SPP was managed by an executive committee (which set policy), an operating committee, and a technical staff located in Little Rock. The latter scheduled power; published operating reports; prepared board studies; and conducted studies for Defense Plant Corporation, Defense Electric Power Administration, National Security Resources Board and so forth.

Following V-J Day in 1945, the executive committee decided to retain the SPP because of the vast experience gained in power pooling and coordination. An intercompany agreement was finalized and signed October 23, 1946. This agreement was renewed every 5 years thereafter and, during the postwar period, five additional systems joined the SPP. In 1948, the SPP installed a full-period leased telephone network with terminals in Shreveport, Wichita, Oklahoma City, Joplin, Tulsa, Pine Bluff, and Little Rock. Costs were shared not only by the SPP members but also by a number of associated systems (located in Missouri and Kansas).

In August 1961, the chairman of the SPP wrote to the TVA suggesting that a diversity exchange then under discussion between the TVA and the MSU be expanded to include all systems of the SPP. The TVA expressed a keen interest in this proposal and, during the following years, an agreement for an exchange of 1500 MW was reached. Because 4 of the SPP's 15 member systems elected not to participate, a separate group known as the South Central Electric Companies was formed to handle the diversity exchange, and in 1965, a coordination center was established in Little Rock adjacent to the SPP offices. The SPP leased telephone network was turned over to the 11 systems making up SCEC in 1965. Since then, the network has been expanded to reach Coughlin Station of the Central Louisiana Electric Company and Beaumont, Texas.

Following the Northeast Blackout in late 1965, a number of reliability organizations were formed in accordance with recommendations of a special FPC task force, which studied the Northeast Blackout. Some of these were formed around existing organizations, and on June 1, 1968, 12 such organizations, including the SPP, formed the National Electric Reliability Council (NERC). Later, four councils merged forming SERC, leaving nine councils in NERC.

Two standing committees were formed by NERC, an Executive Board and the Technical Advisory Committee (TAC). At first, one representative from each council was authorized for each committee. However, for continuity purposes, this number was later changed to two representatives per council. The NERC has merged with NAPSIC; the existing TAC has become the Engineering Committee, and NAPSIC has become the Operating Committee. A Steering Committee will coordinate as an interface with the Executive Committee.

After joining NERC in mid-1968, executives of the SPP began a study to reorganize it into a regional reliability organization. Some 18 months were spent drafting a proposed agreement that could permit all types of systems to become members. On December 17, 1969, 28 systems met in Tulsa and signed a new coordination agreement. By 1975, six additional systems had joined the SPP. By December 31, 1975, the SPP consisted of 22 investor-owned systems, 6 municipalities, 4 G&T cooperatives, 1 State agency, and 1 Federal agency.

During 1973, the South Central Systems of NAPSIC, formerly the Southwest Regional Committee of ISG, voted to merge with the SPP. The merger was subsequently approved by the SPP, and a complete merger has been effected. Two representatives from the SPP now attend all meetings of NAPSIC (now NERC's Operating Committee).

In October 1975, the 11 members of SCEC phased out the SCEC Coordination Center in Little Rock and transferred all scheduling to the MSU Control Center in Pine Bluff, Arkansas. By late 1976, 3 additional systems had joined the SPP, and by early 1979, 4 more systems joined--bringing the total membership up to 41 systems.

MANAGEMENT AND FUNCTIONS

The general management of the pool association is carried out by the board of directors. The board of directors consists of 15 persons elected by the members for 3 calendar years with 5 new directors elected each year. The board of directors elects a chairman from its membership. The chairman or his appointee is the representative of the SPP on the Board of the NERC. A director must be an employee of a member system and must be that member's representative to the SPP.

The board of directors has the following duties:

1. General management and direction of the affairs, functions, and business of the SPP as provided herein
2. Direction of the activities of the committees established by the agreement or that may be appointed by the board
3. Providing for positions, salaries, duties, and other necessary matters pertaining to the SPP staff (including the executive director)
4. Selection of the executive director of the SPP staff who shall serve at the discretion of the board of directors
5. Review, approval, or revision of the actions taken by and the decisions of the coordination committee, any ad hoc committees the coordination committee may constitute, and any other committees appointed by the board, and
6. Act on any appeal made in accordance with the last paragraph of Article VIII, Section 2 of the SPP Coordination Agreement

The coordination committee includes one representative from each member system. A chairman and vice chairman are elected from the committee members. Each member of the coordination committee has one vote on all matters coming before the committee. The chairman of the board of directors, after consultation with the chairman of the coordination committee, appoints the representatives of the SPP on the Technical Advisory Committee of NERC.

The coordination committee has the following responsibilities and duties:

1. Adopts practices for system operation that will help to ensure reliable bulk power supply among the systems in the SPP region (as a guide to the committee, careful consideration shall be given to the provisions of this agreement and to the recommendations of the report, dated June 1967, to the Federal Power Commission by the Advisory Committee on Reliability of Electric Bulk Power Supply)
2. Continues coordination of its efforts with the efforts of the Southwest Regional Group
3. Studies the members' operating plans and problems that are pertinent to the SPP Coordinating Agreement
4. Suggests matters for study by the members
5. Reviews the results of studies submitted to it
6. Studies the reliability of the bulk-electric power supply of the SPP region making use of studies conducted by SCEC, MOKAN, and any other group within the SPP region, and conducting such additional studies as it deems necessary or desirable to

determine the reliability of the bulk-electric power supply of the region under various assumed conditions

7. Develops and recommends to the board of directors reliability criteria for intraregional planning and encourages the adoption of reliability criteria for interregional planning
8. Studies the intraregional plans submitted by the coordinated groups within the SPP region, and recommends planning between intraregional groups
9. Develops a coordinated plan for intraregional transmission for greater reliability of bulk-electric power supply
10. Recommends to the board of directors and to the members individual or joint action to improve the operation of the systems comprising the SPP
11. Recommends any changes in the budget of the SPP staff to the board of directors, and
12. Appoints any subcommittees deemed necessary

Each member is expected to cooperate in the development of plans that may be generally acceptable. In adopting a voluntary and coordinated plan for the SPP region, the committee shall give careful consideration to the recommendations of those systems whose planning and operation can have a major effect on the reliability of the overall bulk-electric power supply of the region.

The SPP staff is headed by an executive director, who employs qualified technical and clerical forces, provides office space, and incurs expenses on behalf of the SPP that meet with the approval of the board of directors.

The members of the SPP operate under the terms of a document entitled "The Southwest Pool Coordination Agreement," which was first signed on December 17, 1969. Since then, this agreement has been amended several times, the last such amendment becoming effective January 1, 1980. This latest amendment simplifies membership application and billing procedures and places more control in the hands of the board of directors primarily to allow more speedy action when required.

To achieve economical benefits and effective system coordination when planning the operation of their respective systems, members of the coordinating agreement have contracts with other pool members, with other systems in the pool area who are not pool members, and with parties outside the pool area. The coordination agreement encourages members to make voluntary interconnection agreements among parties but does not require them to make transmission-line interconnection agreements, nor to install any generation or transmission facilities.

Each member of the SPP Coordination Agreement is responsible for the following:

- Supplying reliable electric service to its customers, wholesale and retail
- Providing transmission facilities adequate to deliver such services throughout its system and operate its system to keep inadvertent power flows into and out of its system at a minimum

- Recognizing that coordination for reliable service in the pool can best be achieved by voluntary action of the members, and
- Considering the requirements for a large, reliable bulk transmission system so that agreement on intraregional and interregional coordination plans will be accomplished and the voluntary planning provided for the SPP Coordination Agreement will be effective

The signators to the agreement are responsible for the operating expenses of the SPP office in accordance with the assessment formula set out in the agreement.

SIGNIFICANT COORDINATION ACCOMPLISHMENTS

Some of the benefits of coordination as practiced by the SPP are as follows:

1. Reduced reserve capacity--the SPP criteria call for 15-percent minimum reserve
2. Reduced ready reserves--the SPP criteria are 3-percent spinning, 3-percent nonspinning
3. Reduced surplus capacity--the SPP has very strong high-voltage and extra high-voltage interconnections that permit all practical surplus interchange
4. Power production economics
    - Joint-generation ownership--several examples such as LaCygne, Jeffrey Energy Center, and Flint Creek with more under construction
    - Optimum generation mix--except for the smallest systems, the generation mix has not been constrained by system size
    - Economic dispatch within the pool--only Middle South Utilities has central dispatch; however, MOKAN and all of the larger systems, because of their size, can achieve near optimal dispatch; smaller systems can share the savings through economy purchases
5. Coordinated maintenance--maintenance schedules are reviewed and distributed by the SPP staff to coordinate schedules
6. Optimized transmission additions--the Transmission Planning Task Force models and evaluates the transmission system, and
7. Joint action--the coordination committee and its various subcommittees encourage a better understanding of mutual supply problems

OUTLOOK

The SPP is now composed of 41 electric utilities in several States. Although more than 85 percent of all energy within the SPP was once generated using natural gas as a boiler fuel, the use of natural gas had been reduced to 59 percent as of 1978 and will decrease to 15 percent in 1988. Table 3 shows the actual and projected generation by principal energy sources. To meet future demands, the SPP has scheduled 40,893 MW of new capacity, as shown in Table 4.

Table 3 shows that by 1988, about 72 percent of the generation will be in nuclear and coal-burning plants. For the period 1988-98, the systems now contemplate adding 58,971 MW of additional capacity of which 24.7 percent will be nuclear, 74.2 percent coal, and 1.1 percent will be either hydroelectric, or "other," or both.

The NERC recently issued a report, "1979 Summary of Projected Peak Load, Generating Capability and Fossil Fuel Requirements," which shows that for NERC, as a whole, by 1988, 20 percent of all capacity will be nuclear and 43 percent will be coal. Given this nationwide move to coal and nuclear, opportunities for interregional energy transfers to displace oil will decrease and intraregional transfers will undoubtedly be more economical.

As the SPP moves toward the late 1980-90's, major impediments, including the transportation of coal and radioactive waste materials, will create logistical problems in the use of coal and nuclear power. By 1998, however, the SPP expects to have in service 88,316 MW of coal-burning capacity and 23,375 MW of nuclear capacity, which will be approximately 80 percent of the total generation mix.

TABLE 3--Generation by Principal Energy Sources
(millions of kilowatt-hours)

Type	1978 (Actual) Generation	1978 (Actual) Percent	1988 (Estimated) Generation	1988 (Estimated) Percent
Nuclear	5,238	2.7	56,410	15.9
Coal	32,042	16.8	197,266	55.7
Oil	35,842	18.7	40,618	11.5
Gas	113,143	59.2	54,670	15.4
Hydroelectric	5,025	2.6	5,190	1.5
Sum	191,290	100.0	354,154	100.0

The principal problems facing the pool probably will be as follows:

- Coal supply and deliverability
- Outages caused by scrubber downtime
- Scheduled overhaul--including nuclear refueling cycles

- Financial problems connected with building an average capacity of 5700 MW per year, and
- Reliability aspects

TABLE 4--Future Generating Capacity
1979-88, Inclusive

Type	Units	Capacity (MW)
Coal	58	29,761
Nuclear	8	8,967
Oil	1	480
Combined Turbines	16	1,469
Hydroelectric	8	214
Diesel	1	2
Sum	92	40,893

At present, the SPP expects to reach a peak demand of 102,701 MW in 1995. Major load centers by 1998 will be New Orleans, Oklahoma City, and Kansas City with smaller load centers at Wichita, Tulsa, Little Rock-North Little Rock, Shreveport, Jackson, and Baton Rouge.

Coping with both these loads and a capacity of almost 140,000 MW will require close coordination between all control centers. Currently, the SPP has approved a pool coordination center complete with an inhouse computer center and terminals capable of 24-hour operations, if required. In 1981-82, the SPP will consider expanding the pool computer to manage online loadflow surveillance; line loading monitoring; and close monitoring of outages, loads, capacity, and spinning reserves. Economy interchange will be conducted routinely to maximize savings in fuel costs. Also, communication links with contiguous councils are anticipated to be required at that time, as well as a monitoring of interregional tieline flows.

In the 1990's, several wind-driven generators may be in service in the Texas Panhandle, western Oklahoma, and western Kansas--areas where prevailing winds might make their use feasible. Also, if the capital costs can be reduced, solar units will probably be installed in most new homes and office buildings to supplement conventional energy sources. Predicting the impact of such sources on area loads is difficult. However, such energy sources--as well as load molding and increased conservation through time-of-day rates--will all require much closer coordination by the SPP and its members.

Given the scenario that prospective economic dispatch centers will be difficult to justify, the SPP will have 80 percent of its capacity in coal-nuclear by the turn of the century (with the remaining capacity being pushed up on the load curve). Probably small generating units will soon be obsolete, and in the near future, only larger and economically sized units will exist. In addition, small and large utilities will participate in joint ownership or long-term purchase power contracts associated with economically sized generating units. For example, a number of small utilities in Arkansas are negotiating for a part of four, large coal-fired units planned by Arkansas Power and Light Company.

THE ELECTRIC RELIABILITY COUNCIL OF TEXAS (ERCOT)

COMPOSITION

The membership of ERCOT is presently composed of 86 electric utilities including 49 cooperatives, 28 municipals, 8 investor-owned, and 1 State agency--all of which are listed in the breakdown that follows.

Cooperatives

B-K
Bartlett
Belfalls
Bluebonnet
Brazos
Cap Rock
Comanche County
Concho Valley
Deep East Texas
Denton County
De Witt County
Dickens County
Fannin County
Farmers
Fayette
Grayson-Collin
Medina
Mid-South
Midwest
Navarro County
New Era
Pedernales
Robertson
Sam Houston
San Bernard
Guadalupe Valley
Hamilton County
Hill County
Hunt-Collin
J-A-C
Jackson
Jasper-Newton
Johnson County
Kaufman County
Kimble
Lamar County
Limestone County
Lone Wolf
Magic Valley
McCulloch
McLennan County
South Texas
Southwest Texas
Stamford
Taylor
Tri-County
Victoria County
Wise
Wharton

Municipalities

- Austin
- Boerne
- Brady
- Brenham
- Brownsville
- Bryan
- Coleman
- Crosbyton
- Cuero
- Denton
- Garland
- Giddings
- Goldthwaite
- Gonzales
- Greenville
- Hearne
- Hemphill
- Hondo
- La Grange
- Livingston
- Lockhart
- Luling
- New Braunfels
- Robstown
- San Antonio
- Schulenburg
- Seguin
- Weimar

Investor-Owned Systems

- Central Power & Light Company
- Community Public Service Company
- Dallas Power & Light Company
- Houston Lighting & Power Company
- Southwestern Electric Service Company
- Texas Electric Service Company
- Texas Power & Light Company
- West Texas Utilities Company

State Agency

Lower Colorado River Authority

HISTORY

The ERCOT was formed voluntarily in 1970 by the electric utility industry in central and west Texas and is one of nine regional councils that make up NERC. (See Figure 1.) The member systems included in ERCOT provide electric service to more than 8 million people and account for 85 percent of the total electric generation within the State. The territory covered is approximately 195,000 square miles, or 73 percent of Texas.

The formal organization of ERCOT was preceded by the organization of TIS in 1967. The TIS covers the same areas as ERCOT and was formed following the joining of the North Texas Interconnected System with the electric power systems of south Texas. Prior to 1967, these two groups had been successfully interconnected and operated in synchronism for over 25 years. Committees responsible for coordinated operations and planning bulk-power supply facilities functioned on a regular basis. (See separate detailed description of TIS in Chapter 5.)

MANAGEMENT AND FUNCTIONS

The organization is governed by a 12-member executive board elected by the members and represent each of the different types of electrical systems in ERCOT. The board has established a technical advisory committee to study both reliability and system adequacy, including cooperation through NERC on matters of national concern. Additional committees such as task forces and special study groups plan and evaluate activities necessary to maintain the system's coordinated operations. A permanent staff, located in San Antonio, serves the board and its committees and acts as liaison with the administrative staff of NERC.

The 12 elected executive board members that govern ERCOT serve 1-year terms. In addition, technical advisory committee members and other individual appointments to the task force and study committees all require participation and acceptance of responsibilities by individuals and member systems. Each member system is obligated to provide a prorated share of the cost of managing ERCOT. This cost is assessed to each system according to energy consumed by the members' customers. The responsibility of planning within ERCOT remains the prerogative of each individual system, but each system submits its program to the council for review and evaluation. The purpose of the council is to establish basic criteria and to coordinate the planning of the bulk power system to achieve adequacy and reliability.

The organization of ERCOT provides an agreement for an orderly combined development of the electrical systems to best benefit all members. Joint ownership of major generating plants and transmission facilities is accomplished through contracts between individual companies. Agreements permit both the sale of excess capacity to and the purchase of reserve energy from any utility including those not immediately adjacent. Most contracts, however, are between neighboring utilities and some of these are for supplying total energy requirements. Third-party contracts are entered into, but specify that such contracts must not jeopardize or impair the existing system operations.

SIGNIFICANT COORDINATION ACCOMPLISHMENTS

The ERCOT organization provided a means of representation in NERC for all intrastate utilities desiring such representation. Cooperation among members resulted in installation of the most economically sized lignite or nuclear units. Joint ownership of plants also allows the smaller systems to secure new capacity at a more economical price. More extensive transmission grids were developed to share the generation from these larger plants.

The grid resulted in improved system reliability by allowing larger power exchanges between companies in case of major service interruptions. The grid also allows for exchange of economy and other types of energy on a regular basis. For example, the CEPL and

WETU report that, since 1973, they have exchanged roughly 2,900,000 MWh resulting in a savings of $4,436,290 to the CEPL and, correspondingly, an equal savings to WETU, all of which results in proportionate savings to the customers of both companies.

During 1978-79, ERCOT representatives, at the request of the Department of Energy together with representatives of the Western Systems Coordinating Council (WSCC) and southwestern State officials, met with representatives of Mexico's Comision Federal de Electricidad to review the potential for increased electricity exchanges between the United States and Mexico.

OUTLOOK

Numerous loadflow studies and several stability studies evaluate the performance of ERCOT. These studies assess the present conditions as well as anticipated future developments. Plans have been formulated to evaluate the reserve criteria of ERCOT. The transmission system includes about 3900 miles of 345-kV lines interconnecting all major generating stations and load centers. In addition, a well-integrated 138-kV network exists.

A Transmission Facilities Services Guidelines Policy has been adopted by TIS to provide guidance within ERCOT in establishing appropriate wheeling rates, and compensation, when necessary, for transmission facilities associated with remotely located generation plants. Plans to develop and upgrade the security centers to more sophisticated controls and exchange systems are now underway and include system incremental cost information and a possible implementation of a power brokerage operation.

Historically, efforts have been made in the ERCOT system to exchange power on an economic basis and these efforts are expected to continue. During the past 2 years, experience has indicated that the compounded annual rate of growth in electric demand has leveled out at about 5 percent. Programs for the next 10 years are trending this rate in the planning of additional facilities. This factor permits a sense of confidence in sizing and location of needed generation and transmission lines. However, the continual changing conditions facing utilities as a result of Federal legislation, new and revised rules of regulating bodies, the availability of fuels, and the ability to finance programs require the consideration of many alternatives in future planning.

Six task forces are continually working on schedules to update their base cases and address new problems as they emerge. Studies not only look ahead as far as 1988 but also conduct power transfer studies for the current year to provide system operators with power flow data for conditions they might encounter.

The new operating conditions expected within ERCOT, because of coal-fired and nuclear units to be located at remote sites, require a reevaluation of the planned reserves of the interconnected system. A comprehensive study is underway to reassess the existing reserve criteria and, if necessary, revise the minimum reserve margin that has been maintained in the past.

As the fuel-cost spread widens, economy energy exchanges within ERCOT have increased, and this trend is expected to continue. The Transmission Facilities Services Guideline Policy, as adopted, will assist in arrangements for wheeling and the use of transmission facilities on other systems.

CHAPTER 4
FORMAL CONTRACTUAL COORDINATION ARRANGEMENTS

MIDDLE SOUTH UTILITIES, INC. (MSU)

COMPOSITION

The MSU operates in Arkansas, Louisiana, Mississippi, and Missouri. Members of the MSU are as follows: Arkansas Power and Light Company, Mississippi Power and Light Company, Arkansas-Missouri Power Company, New Orleans Public Service Company, and the Louisiana Power and Light Company. The MSU is a public utility holding company registered under the Public Utility Holding Company Act of 1935. It owns 100 percent of the voting stock of its five operating subsidiaries.

To centralize the services within the system into a single effective and economic company, the MSU, in 1963 organized the Middle South Service, Inc. (Services). Services is a wholly owned subsidiary of the MSU and limits its services to the five operating companies and to the parent company. At the present time, Services provides the MSU companies with the following advisory and consulting services:

- Tax
- Insurance
- Management and business problems
- Special accounting problems
- Statistical data
- Engineering
- Power sales and interchange
- Rates
- Economic matters
- Advertising, marketing, public relations
- Financing
- Others

In engineering and operating matters, Services assists in the coordinating efforts of system operating companies in load projections, planning power supply and reserves, and the planning of necessary transmission for the companies. Services also assists the operating companies in matters pertaining to exchanges of capacity and energy, coordination of reserves, coordination of maintenance, economic loading, and economy exchange of power.

Generally, Services assists the five operating companies to achieve the best possible coordinated and economic system operation.

COORDINATING AGREEMENTS

During the 1940's, power and energy transactions between the MSU operating companies were accomplished through service schedules. In 1951, the Arkansas Power and Light Company, Louisiana Power and Light Company, and Mississippi Power and Light Company adopted an agreement entitled "Memorandum Re: Administration of Intra-System Transactions and System Planning and Development (Memorandum Re)." In 1956, New Orleans Public Service, Inc., also adopted the agreement. In 1973, a more formal agreement was placed into effect and included the Arkansas-Missouri Power Company. This agreement provided for the planning, construction, and operation of the bulk power facilities on a total MSU basis.

As a part of its objective, the agreement signed in 1973 states:

> The purpose of this Agreement is to provide the contractual basis for the continued planning, construction, and operation of the electric generation, transmission and other facilities of the Companies in such a manner as to achieve the maximum possible economies consistent with the highest practicable reliability of service, with the reasonable utilization of natural resources and effect on the environment, and to provide a basis for equalizing among the Companies any imbalance of costs associated with the construction, ownership and operation of such facilities as are used for the mutual benefit of all the Companies.

The system agreement recognizes that the planning, construction, and operation of the bulk-power supply facilities will be on a total MSU basis. Large generating units can be strategically located to take advantage of both water supply and the lowest fuel cost and can be located in remote areas requiring the installation of major transmission facilities. Furthermore, the total system should, for reliability of service and for economical operations, be controlled from a central dispatching office. To carry out the objectives of the agreement, each operating company has agreed to provide its portion of the major facilities deemed necessary and to share in any benefits and costs of coordinated operations.

Because of this coordinated approach to planning and operations, one or more of the companies can be "long" or "short" of generating capacity in any given year. Moreover, any one company could have an excess or deficiency in bulk transmission facilities. To compensate the "long" company and to provide adequate generating capacity to the "short" company, service schedules have been established to equalize capability and transmission and to handle the exchange of electric energy among the companies. In addition, service schedules also provide for the distribution of revenue from both joint account sales and expenses of the systems operation center.

Compensation to a "long" company in relation to capability equalization is determined by using the company's annual ownership costs and total investment in its most recent unit that qualifies for equalization. The "short" company is then entitled to its pro rata share of energy from this particular unit. Transmission equalization is based on each company's share of the total system's investment in bulk transmission facilities. Bulk transmission is defined as:

- All EHV facilities 345-kV or greater
- All tielines 115-kV and greater between systems
- Any other line designated by the operating committee

Compensation between companies is calculated using the company's investment in bulk transmission facilities and annual ownership costs.

The total MSU system is operated to obtain the lowest cost of energy to all companies. Energy so generated is exchanged among the companies with the lowest cost sources available in the following order:

1. First to the company having such sources
2. Second to supply the requirements of other companies (pool energy)
3. Third to supply the requirements for sales to others

Compensation to the "long" company is based on fuel cost plus an adder that depends on the fuel used to generate the energy.

A service schedule has also been developed to distribute the revenue from sales to others. Essentially, the generating company is reimbursed for its out-of-pocket expense and the resulting net revenue is then prorated to each of the companies.

Because the system agreement provides for a central dispatch center, the expense of the center must be prorated among the companies. This prorating is accomplished by a service schedule. As with Memorandum Re, the system agreement provides for an operating committee to administer the agreement. The operating committee consists of one member from each of the operating companies and one member from Middle South Services.

MAJOR ELEMENTS OF COORDINATION

The MSU companies have a long history of coordinated planning and operation. This approach has been beneficial to all customers of the MSU because of the following:

- Economies of scale
- Lowest possible cost of power and energy to customers, and
- A more reliable system

The planning, construction, and operation of the bulk-power supply facilities are based on the total MSU system to obtain the lowest cost of energy to all the MSU companies. This allows the construction of generating units at strategic locations that take advantage of water supply and lowest cost fuel. The total system is controlled from a central dispatching office for economical operation and reliability of service. Each company provides its portion of the major facilities determined to be necessary and shares in any benefits and costs of coordinated operations.

EXTERNAL RELATIONSHIPS OF MEMBERS AND POOL

Joint planning and operations has not been limited to companies within the MSU system. During World War II, the MSU cooperated with other systems to form the SPP. In the early 1960's, the MSU worked with seven other companies to form SCEC; SCEC along with the TVA planned and constructed an EHV transmission system that allowed the seasonal diversity exchange of 1,500 MW.

The EHV system has expanded and, as a result, was able to export large quantities of energy to the Northeast during the coal strike. Recently, to conserve oil, the EHV system has been used to import large quantities of energy generated with coal and natural gas. The EHV system is also available for large-scale economic and emergency transactions.

OUTLOOK

Two of the MSU companies are presently constructing large coal and nuclear units that will be jointly owned with municipal systems and REA cooperatives. This, along with the necessary transmission service arrangements, will provide baseload generation and economies of scale to the smaller systems of the area. As the load grows and other developments occur, the MSU system will continue to provide its existing operations and expand its services and facilities as the electric power industry requires.

The MSU system will continue to coordinate with other members of the SPP and the TVA in the scheduling of maintenance and sharing reserves and providing the lowest cost to the consumer.

MISSOURI-KANSAS POOL (MOKAN)

COMPOSITION

Presently, eight investor-owned utilities and one G&T electric cooperative are members of MOKAN. The utilities and the dates when they jointed the pool are as follows:

Kansas City Power and Light Company (KCPL),
    Kansas City, Missouri--1962
Kansas Power and Light Company (KAPL),
    Topeka, Kansas--1962
Missouri Public Service Company (MIPU),
    Raytown, Missouri--1962

Empire District Electric Company (EMDE),
    Joplin, Missouri--1962
Kansas Gas and Electric Company (KAGE),
    Wichita, Kansas--1962
Central Telephone and Utilities Corporation--Kansas Division
    (CETU),
    Great Bend, Kansas--1970
Central Kansas Power Company, Inc. (CEKP),
    Hays, Kansas--1970
Sunflower Electric Cooperative, Inc. (SUNF),
    Hays, Kansas--1977
St. Joseph Light and Power Company (SAJL),
    St. Joseph, Missouri--1979

Under the terms stated in the General Participation Agreement, an executive committee, which is composed of the chief executive officers from each of the participating companies, establishes the general policies for the guidance of an operating committee, which is composed of nine representatives appointed by the participants. The representative is usually an operating vice president.

The operating committee, in addition to assuming such duties as may be assigned to it from time to time by the executive committee, has the following functions:

- Determining operating rules and procedures, including preparation of an operating manual
- Coordinating maintenance schedules
- Determining spinning reserve requirements
- Coordinating load projections
- Making stability studies and recommending additional transmission facilities as needed
- Coordinating standards for operation of interconnection
- Coordinating plans and recommending additional generating capacity installations and power purchase agreements
- Supervising all other phases of interconnected operations

Any dispute in the operating committee may be referred to the executive committee for determination; any dispute in the executive committee may be referred to arbitration for settlement.

COORDINATING AGREEMENTS

Discussions leading to the formulation of the MOKAN Pool began in 1959 by five electric utilities operating in either western Missouri, or eastern Kansas, or both. The five basic participants were as follows:

Kansas City Power and Light Company (KCPL)
    Kansas City, Missouri
Missouri Public Service Company (MIPU)
    Raytown, Missouri

Empire District Electric Company (EMDE)
    Joplin, Missouri
Kansas Gas and Electric Company (KAGE)
    Wichita, Kansas
Kansas Power and Light Company (KAPL)
    Topeka, Kansas

In 1959, each basic participant provided and maintained interconnections with one or more of the others to interchange firm power, emergency energy, and economy energy service. However, the total interchange capability among their systems was not sufficient to yield effective sharing to reserve generating capacity. To promote further interconnections of their systems, the five basic companies signed a General Participation Agreement on March 28, 1962. This agreement formed the nucleus for MOKAN. The five electric companies then invested approximately $5 million in additional transmission facilities to provide further 161-kV interconnections and interchange capability between their systems. This enables the systems to share reserve capacity effectively and allows each to enter into agreements to interchange firm power, economy energy, and other classes of service.

The General Participation Agreement signed by the five electric utilities--KAGE, KAPL, KACP, EMDE, and MIPU--in March 1962 provided the following:

- The further interconnection of their systems
- The sharing of reserve generating capacity as a means of reducing their reserve capacity requirements
- The exchange of standby service among such participants to maintain service reliability on their systems
- A continuing operational and administrative relationship among such participants to achieve operating economies and reliability through coordinated planning, operations, transactions, and arrangements among themselves and individually with other power suppliers in the same and other areas

In June 1965, three additional contracts were executed that provided for 345-kV transmission facilities for interconnections between KAGE, KAPL, KACP, MIPU, and a tie with Union Electric Company in eastern Missouri.* By 1969, the five utilities had invested more than $40 million in transmission facilities to achieve operating economies and to enhance service reliability.

Each participant retains complete autonomy with respect to all transactions and arrangements with other power suppliers. As a result, additional 345-kV interconnection facilities have been constructed, and the pool now has ties with electric utilities in Oklahoma, Missouri, Arkansas, and Nebraska.

The Missouri Facilities Agreement was signed by KACP and MIPU to provide a 345-kV interconnection between their systems and the system of Union Electric Company. A 345-kV transmission line, and associate facilities, was constructed from KACP's Stilwell substation to MIPU's 345-kV switching station site near Sibley, Missouri; it was then extended to Union's 345-kV facilities at the Overton substation near Overton, Missouri.

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*The Missouri Facilities Agreement, the Kansas Facilities Agreement, and the MOKAN Coordination Agreement.

To provide a 345-kV interconnection among their systems, KAGE, KAPL, and KACP signed the Kansas Facilities Agreement. A 345-kV transmission line, substations, and associated facilities were constructed from KAGE's Gordon Evans plant to KAPL's Swissvale substation and extended on to KCPL's Stilwell substation.

The MOKAN Coordination Agreement specified the terms and operating procedures for each company involved in the 345-kV MOKAN interconnections.

In April 1968, MIPU and KCPL signed the Missouri Coordination Agreement, which provided additional points of interconnection for their 345-kV transmission system; the latter was build under the terms of the Missouri Facilities Agreement.

The General Participation Agreement has been amended four times to provide for the addition of new members, to increase the required capacity reserves percentages, and to set forth the rates for reserve and standby service.

MAJOR ELEMENTS OF COORDINATION

By interconnection of their electric systems and agreements as to procedures, the members (1) provide for the exchange of reserve generating capacity, (2) promote economical interchange of power and energy among both participants and other interconnected systems, and (3) coordinate maintenance scheduling of major units. Members are to carry out the rules and operating procedures adopted by the operating and executive committee of the pool.

The pool members have benefited from a uniform method of testing generating units for accreditation, which is used in the capacity reserves equalization program. Each member coordinates all planning and operations through the operating committee. Although not included in the MOKAN agreements, additional 345-kV ties have been made to other companies outside of the pool area, which also benefit MOKAN pool members.

The following are examples of problems that members of MOKAN have experienced and that exist at the present time.

- Different state regulatory jurisdictions
- Different forms of ownership
- Unequal financial resources
- Low load density service areas

EXTERNAL RELATIONSHIPS OF MEMBERS AND POOL

As mentioned under the section on coordinating agreements, the members of MOKAN exchange energy with other members of the SPP and additionally with Union Electric Company, the Omaha Public Power District, the Nebraska Public Power District, and other individual members of MAPP. These exchanges are made over transmission ties at the 345-kV and 161-kV levels. Members of MOKAN coordinate scheduling the maintenance of major units and coordinate the exchange of power with other systems of the SPP and OPPD and with the NPPD and the UNEC. Each MOKAN member retains complete autonomy with respect to all transactions and exchanges with other power suppliers with which they are interconnected. MOKAN Pool members also have interconnections with many generating municipals, several of whom were electrically isolated until the 1960's and 1970's. They now have the advantages of improved economy and reliability of operation.

OUTLOOK

The MOKAN Pool has a promising future because of their continuous planning for generaton and transmission facilities necessary to carry the electric load in the pool. The MOKAN members are committed to the concept of jointly owned units. The jointly owned Jeffrey Center with its planned 2800 MW of coal-fired capacity is a very stable contribution to the pool. The jointly owned La Cygne, Iatan, and Wolf Creek generating stations make similar contributions. Currently, a total of eight units are jointly owned by eight utilities and possess a total capacity of approximately 6000 MW. The REA cooperatives and the municipalities will also benefit from the low-cost, coal-fired and nuclear generation from these facilities.

The sharing of reserve capacity has reduced the overall reserve requirements of the companies. This has also provided standby capacity and energy necessary to handle emergency conditions.

The coordination agreement has allowed the companies to install larger units than are normally installed by individual companies, thus yielding benefits by economies of scale.

The executive committee of MOKAN has directed its operating committee to design and institute a "brokerage" type system* for the exchange of economy energy, that would meet the characteristics of the MOKAN Pool.

The Fort Worth office of the Economic Regulatory Administration is conducting the Missouri, Kansas, and Oklahoma (MOKANOK) pooling study, which will include the major utilities in both Oklahoma and the MOKAN area. This study should provide quantitative information on what savings may or may not be available from increased coordination in the "MOKANOK" area.

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*This system was initiated in March 1980.

SOUTH CENTRAL ELECTRIC COMPANIES (SCEC)

COMPOSITION

The SCEC is an association consisting of 11 privately owned electric utilities operating in the south central United States. In 1959, Mississippi Power and Light Company initiated negotiations with the TVA concerning possible interchanges of seasonal load diversity capacity. The discussions resulted from the TVA exhibiting a winter peakload approximately 3000 MW greater than its summer peak, whereas SCEC showed the opposite situation. Contracts were arranged by both adjoining companies and Mississippi Power and Light Company to relay an exchange of a seasonal load diversity of up to 1500 MW to the TVA. The 11 participants signed a coordination agreement in 1964 to implement the several contractual agreements.

Member companies of SCEC are as follows:

Arkansas Power and Light Company
Central Louisiana Electric Company
The Empire District Electric Company
Gulf States Utilities Company
Kansas Gas and Electric Company
Louisiana Power and Light Company
Mississippi Power and Light Company
New Orleans Public Service, Inc.
Oklahoma Gas and Electric Company
Public Service Company of Oklahoma
Southwestern Electric Power Company

The agreement provides for an operating committee to carry out interconnected operations. This committee is composed of one participant from each member system and meets regularly in the spring and fall of each year and at other times as determined by the chairman or members. All decisions of the committee must be unanimous except for the election of officers.

An operations center was also established to implement and carry out company commitments specified under the several interconnection agreements and, also, to provide effective operating procedures adopted by the operating committee. This operations center was located at Little Rock, Arkansas. The staff had the following principal duties:

1. To operate the headquarters office and maintain such records as the operating committee designates
2. To determine the most effective scheduling of power sources for the fulfillment of participants' commitments as specified under the interconnection agreements
3. To collect and disseminate scheduling information
4. To make incremental loss computations as necessary
5. To provide participants with energy billing and accounting information specifically relating to the obligations of participants as specified under the interconnection agreements

6. To maintain liaison with the TVA in carrying out their responsibilities as specified under the interconnection agreements
7. To collect and disseminate energy cost data, to encourage economy interchange between participants and between SCEC and the TVA
8. To prepare other pertinent reports such as the computation of facilities or use charges, coordination of maintenance schedules, and coordination of load and capability studies

Each participant has one member on the planning and engineering committee, which uses engineering service organizations and consultants when necessary. The reports and studies of this committee receive the attention of the operating committee at each of the latter's meetings. The SCEC companies are committed to the reserve capacity policies adopted by the Southwest Regional Group of NAPSIC. Transactions between pool members are handled according to contract billing paths. Transactions with nonpool members or other pools have not yet been attempted on a group basis; such transactions are handled by the initiating participant. Some participants are also members of other pooling groups: Kansas Gas and Electric Company and the Empire District Electric Company are the participants in MOKAN, and Empire is a participant in the Missouri Integration Agreement.

In October 1975, the 11 members of SCEC phased out the SCEC Coordination Center in Little Rock and transferred all scheduling to the Middle South Control Center in Pine Bluff, Arkansas.

COORDINATION AGREEMENTS

The 1964 coordination agreement contracted for the ultimate exchange of 1500-MW diversity. At that time, no monetary payments were required for regular diversity capacity and the accompanying energy because equal amounts would be available to both SCEC in the summer and the TVA in the winter. Initially, SCEC delivered 500 MW to the TVA for the 17 weeks beginning November 15, 1966, and the TVA returned 500 MW to SCEC during the 17 weeks beginning June 1, 1967. The regular diversity capacity was increased to 1000 MW for the exchange year beginning November 15, 1968. The exchange amount was to remain at 1500 MW for a minimum contract term of 10 years, unless increased or decreased by mutual agreement. The contract can be cancelled by either party with a 4-year advance notice after the 10th exchange year. The regular diversity capacity must be supplied and received for 1300 hours; any alteration must be by mutual agreement between the supplying and receiving parties.

During negotiations, SCEC discovered that they could economically use more capacity during the summers of 1965-68 than would be available under the present diversity exchange. Therefore, a separate schedule of deliveries and contract prices was devised to allow purchasing of capacity and energy from the TVA. To help SCEC meet summer peaks from 1966-68, an additional diversity capacity schedule was agreed upon. No monetary payment was required for the capacity, but energy was purchased. Also, diversity capacity was paid back to the TVA on a deferred basis that allotted SCEC a 9-months' advance notice for return of capacity in amounts not to exceed 600 MW.

Economy energy schedules provide for the sale or purchase of economy energy between SCEC and the TVA, as well as the sale or purchase of economy energy between companies in SCEC. The rate for economy energy is the seller's incremental cost plus one-half of the difference between the seller's incremental cost and the buyer's decremental cost. (This method is commonly referred to as "split-savings.") The economy energy schedules may be used in connection with the receipt and delivery of energy asssociated with diversity capacity. In many instances, both SCEC companies and the TVA find it economical to purchase such economy energy to meet their commitments under the diversity-capacity exchange schedules. The economy energy schedules may be used when any of the utilities find it mutually beneficial.

An additional schedule was drafted that provided for the sale of power and energy among SCEC companies during the 17 weeks beginning November 15 of any year.

FUNCTIONS AND RESPONSIBILITIES

The 1964 coordination agreement provides for an operating committee whose primary duties are as follows:

1. To review load and capability for participants' forecasts
2. To conduct joint planning studies relating to the generation and transmission requirements of the participants
3. To determine minimum reserve capacity requirements
4. To coordinate maintenance schedules
5. To establish such operating procedures as may be beneficial to interconnected operation
6. To establish budgets and approve expenditures
7. To adopt methods for the determination of incremental power losses
8. To maintain a power coordination center office

The responsibility for the installation, ownership, operation, and maintenance of all EHV facilities is borne by SCEC in the companies, service area and by the TVA in its service area. Basically, each SCEC company is to own, operate, and maintain those EHV facilities required in its service area; financing is handled on a group basis. The annual cost of ownership, operation, and maintenance of company facilities is prorated to each company by a formula based on the following:

- The portion of such facilities installed by that company compared with the total EHV facilities installed by all SCEC companies

- The percentage participation by that company in (a) diversity capacity exchange, and (b) purchase of TVA power in 1965, 1966, and 1967

Companies that had installed EHV facilities in their service areas were able to use the facilities for purposes other than a power interchange with the TVA and were thus receiving inherent benefits. Because SCEC had constructed approximately 1150 miles of EHV transmission lines and substations, SCEC, beginning in 1969, specified that each company owning these facilities was to absorb 5 percent of the annual charges for the EHV facilities in its service area. Each year thereafter, for a total of 10 years, the amount to be absorbed was to be increased by 5 percent. Consequently, at the end of the 10-year period, annual charges to be shared by the companies were reduced to 50 percent of the initial annual charges.

OUTLOOK

The 1500-MW diversity exchange required the construction of about 940 miles of 500-kV lines and 200 miles of 345-kV lines, all of which provided a very strong transmission system in the south central portion of the United States. In addition, the 1500-MW diversity postponed the construction of 3000 MW of generating capacity and saved an estimated $100 million in capital expenditures. The EHV system provides numerous economic benefits and operating advantages of a continuing nature to the 11 SCEC companies and other utilities in the eastern United States in addition to the exchange of diversity capacity with the TVA. Some of these other operating and economic benefits derived from use of the EHV system include the following:

- More effective joint planning among the companies, accomplished by the staggering of generating unit additions and the installation of larger and more efficient generating units
- Greater potential for mutually beneficial purchases and sales of capacity and energy among the companies
- Substantial increase in the purchase and sale of economy energy among the companies and between SCEC and the TVA
- Greater and more effective assistance in emergencies
- Improved service reliability, and
- More effective and economical utilization of generating and transmission facilities

Beginning with the 1979 exchange year, the seasonal diversity has been reduced by the TVA to 1100 MW, and a further reduction to 700 MW is scheduled for the 1980 exchange year. The TVA has stated that this reduction is necessary because of the change in their annual load curve; mainly, the differential between summer and winter peak is no longer sufficient to maintain the seasonal diversity at 1500 MW. The final level of seasonal diversity cannot be predicted because load and energy forecasts are still under review and study by the TVA. However, even if the seasonal diversity is finally reduced to zero, the extensive transmission network that was initiated by the original SCEC-TVA agreement will continue to provide increasing benefits in economical cost saving firm, emergency, and economy interchange.

TEXAS UTILITIES COMPANY SYSTEM (TUSI)

COMPOSITION

The TUSI is a public utility holding company registered under the Holding Company Act of 1935. The TUSI subsidiaries include three operating companies: Dallas Power and Light Company, Texas Power and Light Company, Texas Electric Service Company, and associated service organizations. The system provides electric service to 87 counties in north central, east, and west Texas, with more than 4 million people--about one-third of the population of the State--receiving service.

For many years, generating capacity of these three operating utilities has been coordinated to install the largest economical units available. Fuel supplies have been predominantly natural gas, and generator construction has included low-cost outdoor boilers and turbine generators. In the mid-1960's, a general shift away from natural gas to solid and nuclear fuels began and was channeled through joint powerplant construction. The first jointly owned lignite powerplant was activated in late 1971; presently, eight jointly owned units are in service in three powerplants using lignite as fuel and comprising a total capability of 5300 MW. (Jointly owned capacity will increase about 7400 MW by 1983, and additional jointly owned units are planned beyond that.)

In 1971, the system was 100 percent gas-fired generation. Today, nearly 50 percent of the energy needs are supplied from lignite. By the middle to late 1980's, approximately 70 percent of the energy requirements will be served from lignite and nuclear generation.

Dallas Power and Light Company serves the city of Dallas, the Nation's seventh largest city, and three adjoining incorporated communities. Texas Electric Service Company provides service to 48 counties in north central and west Texas, including Fort Worth, and 74 other incorporated municipalities; Texas Power and Light Company serves customers in 51 counties in north central and east Texas, including 263 municipalities. Other subsidiaries of TUSI are Texas Utilities Services, Inc., which provides engineering, construction management, financial, and other services to the operating utilities; Texas Utilities Fuel Company, which acquires, stores, and transports natural gas and fuel oil for the operating utilities; and Texas Utilities Generating Company, which operates the jointly owned generating stations.

The electric systems of the three operating utilities have been coordinated through the years. Jointly owned powerplants have recently increased the level of coordination and integration. Close liaison is maintained between the engineering and operating functions of the three companies in design and operation of the generation and transmission system.

COORDINATING AGREEMENTS

Agreements negotiated by the companies involved in each joint endeavor detail ownership, construction, operation, and maintenance. Ownership of each generating unit is described in a joint ownership agreement, as are transmission lines associated with that unit. Construction agreements are likewise executed. Operation and maintenance agreements concerning joint units and joint transmission lines are also executed. Generating units and transmission lines are shared by means of an undivided interest in these facilities.

Agreements have been executed with the Texas Municipal Power Agency (TMPA) and the Brazos Electric Power Cooperative, Inc. (BREP) concerning the joint ownership of two 1150-MW nuclear units at Comanche Peak and the transmission lines associated with that plant.

Agreements have been executed with other members of ERCOT for ready-economy sales and offpeak interruptible sales of energy. Agreements have also been made between the member companies and the Texas Utilities Fuel Company for the acquisition, gathering, and delivering of natural gas and oil to the companies.

MAJOR ELEMENTS OF COORDINATION

Among the responsibilities of each of the operating utilities of TUSI are (1) the maintenance of an agreed level of installed and spinning reserve, and (2) the contribution to a solution for emergency power supply problems elsewhere within ERCOT.

When generation was predominantly gas-fired, the criterion for installed reserve was a minimum of 15 percent above expected annual peakload. This criterion is now being studied to determine the effect of solid- and nuclear-fueled capacity on required reserve. Actual reserve has tended to be considerably higher than the minimum because of actual loads being less than estimated. Spinning reserve levels and their allocation between companies are coordinated among TUSI companies and others in ERCOT.

Other responsibilities of each company include the maintaining of generation and transmission in a state of readiness to respond to additional load requirements in emergency situations. To fulfill this responsibility, each company must (1) ascertain the ability of generating units to respond with increased output when generation is lost, and (2) maintain transmission lines, equipment, and protective relays such that reliable and dependable operation can be obtained during both normal and emergency conditions.

Joint planning and operations have resulted in companies taking advantage of the economies of scale, joint ownership of large lignite and nuclear generating units, and the bulk-power transmission system. Joint planning has also resulted in the acquiring of fuels and the operation of an extensive gas transmission system that benefit the company's customers. Continued customer benefits are anticipated as future endeavors are jointly undertaken by the companies and other utilities.

EXTERNAL RELATIONSHIPS OF MEMBERS AND POOL

The TUSI has a long history of coordinated planning and operation that has produced minimum cost and reliable service to its customers. Economy interchange and interruptible sales between companies and other members of ERCOT are effected when the opportunity exists. The bulk power system of the three TUSI companies is being developed as a unit that can result in major interchange capabilities between companies.

The TUSI does not have any interconnections to systems outside of ERCOT area and, as a result, does not coordinate any operations with other systems.

OUTLOOK

The operations of TUSI have achieved a high level of coordination through (1) joint powerplant and transmission construction, (2) the dispatch of jointly owned capacities via a central control center, and (3) the integration of the central control center with the dispatch centers of individual companies.

Plans are now being made to expand the scope of duties of the central dispatch center. Complete unit commitment and central dispatch including fuel management and accounting functions are planned.

THE CENTRAL AND SOUTH WEST CORPORATION (CSW)

COMPOSITION

The CSW is a public utility holding company that owns the common stock and coordinates the operation of four electric utility companies in the Southwest. These four companies are:

- Southwestern Electric Power Company (SOEP), which serves part of western Oklahoma, northeastern Texas, and northwestern Louisiana
- Public Service Company of Oklahoma (PSOK), which serves eastern Oklahoma and southwestern Oklahoma
- West Texas Utilities Company (WETU), which serves a large area of western and southwestern Texas
- Central Power and Light Company (CEPL) which serves a large part of south Texas

The two companies in south and west Texas, the CEPL and WETU, are part of ERCOT, which operates entirely intrastate with no interconnection transmission to any other company operating outside of Texas. On the other hand, the two other CSW companies, PSOK and SOEP, operate within the SPP, and are thus interconnected with the rest of the northern and eastern United States. The CSW system, therefore, does not operate electrically interconnected.

COORDINATING AGREEMENTS

The CSW was incorporated in 1925 under the laws of Delaware. As stated in the section above, Central and South West Corporation is a public utility holding company.

MAJOR ELEMENTS OF COORDINATION

The corporation has been studying the benefits that might accrue from the synchronous and centrally dispatched operation of the system companies. This mode of operation would require stronger interconections both within the system and with neighboring electric utilities. The CSW has applied to the Security and Exchange Commission (SEC) and regulatory agencies for synchronous operation and this matter is still before the courts and agencies.

Central and South West Services, Inc., a subsidiary of the CSW, performs accounting, tax, and other services for the corporation and the operating companies.

EXTERNAL RELATIONSHIPS OF MEMBERS

The SOEP and PSOK operate interconnected with the SPP and serve customers in Oklahoma, Louisiana, and northeastern Texas. These two companies are not electrically interconnected with the CEPL and WETU.

OUTLOOK

The CSW engaged Power Technologies, Inc. during 1975 to make a study of interconnecting the four operating companies. This study showed benefits resulting from joint planning, generating unit expansion, and central dispatch operation; the corporation is now seeking approval from regulatory agencies and the courts for establishment of an interconnection.

TEXAS MUNICIPAL POWER POOL (TMPP)

COMPOSITION

The TMPP, another coordinating group within ERCOT, has five members. The TMPP was originally formed in 1963 by the cities of Bryan, Garland, and Greenville, along with the Brazos Electric Power Cooperative (BREP). In 1969, the city of Denton joined, becoming the fifth member.

COORDINATING AGREEMENTS

The pool was formed after a study comparing the cost of coordinated operations to continued individual system operations. The pool agreement established management procedures and provided for the coordination of capacity and spinning reserve, as well as for the purchase and sale of supplemental, maintenance, and emergency energy. Procedures also provided for cost sharing of jointly used facilties, and a "take your turn" formula for additions of new generating capacity. The BREP presently allocates the energy and capacity sharing resources of the pool.

OUTLOOK

Original TMPP studies indicated the present fixed-cost savings would amount to approximately \$8.5 million during the first 10 years of operation. Recent cost comparisons completed by the TMPP staff have confirmed these estimates as reasonable.

CHAPTER 5
INFORMAL ORGANIZATIONS FOR COORDINATION

INTRODUCTION

A large number of power pooling and coordinating organizations are in the South Central Region with varying degrees of authority and with various levels of activity. Some have been formed by legislative permission and others on a voluntary basis, but all of them have a common purpose in that they are intended to benefit the power customer to some degree. A number of these organizations are described in this chapter.

TEXAS INTERCONNECTED SYSTEM (TIS)

COMPOSITION--NORTH TIS, SOUTH TIS

The TIS is an interconnected organization of bulk power systems that was officially organized in 1967 and, at that time, consisted of nine utilities. This group consisted of two suborganizations--the North Texas Interconnected Systems (NTIS) and the South Texas Interconnected Systems (STIS). The NTIS consisted of four investor-owned utilities, and the STIS included two municipal systems, two investor-owned utilities, and one State authority. Security centers maintain overall system surveillance and operation for each of the two suborganizations. The NTIS Security Center, located in Dallas, Texas, is operated by the Texas Utilities Generating Company; the STIS Security Center, located in Austin, Texas, is operated by Lower Colorado River Authority. Other electrical systems have joined TIS since its beginning and it now has 13 members as follows:

City of Austin
City of Brownsville
City Public Service Board of San Antonio
Lower Colorado River Authority
Medina Electric Cooperative-South Texas Electric
  Cooperative
Central Power and Light Company
Dallas Power and Light Company
Texas Electric Service Company
Texas Power and Light Company
West Texas Utilities Company

Houston Lighting and Power Company
Texas Municipal Power Pool
Texas Municipal Power Agency

COORDINATING AGREEMENTS

The TIS has successfully operated on an informal basis since 1942. This was accomplished through regularly scheduled meetings, the establishment of an elaborate communications program, and the dedication of its members to providing an uninterrupted supply of power to its customers. With the growing complexity of the individual systems, however, a more formal organizational structure was needed. Therefore, a coordination agreement was adopted and signed in 1967 by each of the nine companies, and TIS was officially formed.

The purpose of the interconnected system, as defined by the agreement, was "to insure the most effective coordination of planning and operation of bulk-power supply facilities to obtain maximum reliability." In addition, an administrative committee consisting of executives of each of the nine systems and two subcommittees for operations and planning were formed with specific assignments. General system development including current and future load requirements, generation scheduling, communications, maintenance, transmission construction, and all other phases of TIS' operation will now be coordinated through these committees.

Each company is allowed to appoint one person to act as its representative on the administrative committee. This person has the authority to act for this company in any matter pertaining to the purpose of this agreement. These responsibilities are:

1. To determine and establish general policy with regard to coordination of planning and operation of TIS
2. To review and evaluate criteria and procedures affecting the reliability of bulk-power supply facilities, and
3. To appoint chairmen and make assignments to the planning subcommittee and the operating subcommittee, and to provide information and data to each of the companies and to other organizations as deemed necessary

Each member of the administrative committee can appoint a person to act as his representative to the planning subcommittee. The duties of this subcommittee are to (1) perform and evaluate steady state loadflow and stability studies, (2) review basic plans for development of the systems, (3) make such recommendations as appropriate to the committee, and (4) perform other planning duties as directed by the committee.

Moreover, each member of the administrative committee can also appoint a person to act as his representative to the operating subcommittee. The duties of this subcommittee shall be to make appropriate recommendations to the committee that cover the coordination of all phases of the interconnected system operation.

Their studies are primarily to study relay settings, communication facilities, allocation of spinning reserve generation, system dispatching procedures, load frequency tieline control, load shedding procedures, coordination of maintenance schedules, and system and group protective measures.

MAJOR ELEMENTS OF COORDINATION

For more than 25 years, nine power companies within the State have successfully operated as one large interconnected system. The two groups in TIS--the STIS and the NTIS--are both united by two 345-kV lines from Dallas to Houston and by several 138-kV lines from Lower Colorado River Authority, Central Power and Light Company, and West Texas Utilities Company. Future transmission associated with TIS operations is committed to 345 kV.

To ensure reliable operation, spinning reserve or generating capacity available to instantaneously accept additional load must be connected to the power system at all times to respond to the loss of a generating unit or power source that would result in a reduction in system frequency. The TIS keeps spinning reserve continually online and available for load at all times. This reserve is never less than the capacity of the largest generator plus 100 MW in the NTIS and the largest generator plus 100 MW in the STIS. Thus, a minimum of well over 1000 MW of reserve generating capacity is always available in an emergency situation. Spinning reserve is well distributed among the many generators on each utility system and is reallocated annually between all members of TIS.

Characteristics of a coordinated area power system are such that with the loss of any unit carrying load, other generating units throughout the entire interconnection automatically pick up a proportionate share of that loss. When a large generator operating with normal power load is unexpectedly tripped out of service, other TIS generating plants immediately contribute capacity to make up the deficiency in proportion to the capacity each company has in service at the time. Thus, the type of coordinated operation adopted by TIS provides maximum reliability to each of the participating companies. To ensure assistance, system tielines, as well as the internal transmission system, have reserve or standby capacity to carry emergency power flows following generation loss.

EXTERNAL RELATIONSHIPS

The continued interest of the TIS organization in the expansion of system coordination and operational agreements to include additional utilities as electrical requirements dictated was evidenced by the formation of ERCOT. Future expansion of pooling agreements and development of relationships with additional utilities will be accomplished through ERCOT. For these reasons TIS is now a part of ERCOT.

OUTLOOK

Studies are presently in progress to determine the benefits of establishing a central control center to improve communications, economy energy exchanges, reserve sharing, and other system operations. Studies of this type are an ongoing activity in the organization.

TEXAS MUNICIPAL POWER AGENCY (TMPA)

COMPOSITION

In 1975, the Texas Legislature passed a law allowing municipal utilities to create municipal power agencies by concurrent ordinances. This important legal authority allowed municipal participants to construct and operate jointly owned facilities. As a result, the four municipalities in the TMPP formed the TMPA. This agency presently maintains an office and staff in Arlington, Texas.

COORDINATING AGREEMENTS

The TMPA has acquired a lignite fuel source and has initiated construction of a 400-MW steam-electric generating plant. The TMPA has also executed an agreement to purchase a share in the Comanche Peak Nuclear Plant now being constructed by TUSI. A transmission network is under construction to deliver energy from these projects and economic dispatch operations are being performed. The TMPA has the authority to sell revenue bonds to finance the agency operations.

SOUTHEAST MISSOURI-NORTHEAST ARKANSAS MUNICIPAL UTILITIES ASSOCIATION (SEMO-NEARK)

COMPOSITION

The SEMO-NEARK has been in existence for approximately 39 years. The 12 municipalities in this organization are located in the general area of southeast Missouri and northeast Arkansas. The following municipal utilities are members:

Jonesboro, Arkansas
Paragould, Arkansas
Piggott, Arkansas
Osceola, Arkansas
Farmington, Missouri
Fredericktown, Missouri
Jackson, Missouri
Kennett, Missouri
Malden, Missouri

New Madrid, Missouri
Poplar Bluff, Missouri
Sikeston, Missouri

MAJOR ELEMENTS OF COORDINATION

This group meets monthly to discuss future plans and activities of common interest to members. Most of these systems are power customers of the SPA. They are working to ensure the continuance of future power supplies to customers because SPA has not been able to furnish additional energy for load growth since 1975. The city of Sikeston, Missouri, is constructing a 207-MW coal-fired steamplant to be placed in service in mid-1981. Excess capacity available from this plant will be shared with other members of SEMO-NEARK.

OUTLOOK

The deteriorating fuel supply situation has almost completely prevented these systems from installing their own generating units. Contracts with neighboring utilities in the area are providing most of the additional energy requirements for these municipals.

KANSAS MUNICIPAL ENERGY AGENCY (KMEA)

COMPOSITION

To arrange long-term power supplies for its members 14 electric utilities located in the northwest area of Kansas formed the Northwest Kansas Power Agency (NWKPA) in 1972. This agency includes eight municipals, five distribution cooperatives, and one generation and transmission cooperative. During 1979, a group of 18 municipal utilities in eastern Kansas were in the process of organizing the Eastern Kansas Municipal Energy Agency. In January 1980, the two groups merged and formed a single agency that was called the Kansas Municipal Energy Agency (KMEA). About 30 municipal systems of the 64 municipalities in Kansas are members of the KMEA.

COORDINATING AGREEMENTS

Legislation enacted in 1977 provided for power pooling by municipalities in Kansas. Cities joining a power pool must place the issue before its citizens for a decision if initially protested by 10 percent of the cities' qualified voters. This bill brought about the formation of a new group by seven of the municipalities in the NWKPA; this group formed the Northwest Kansas Municipal Energy Agency, which has an office in Hays, Kansas. This agency has appointed a general manager and commissioned a consulting firm to study load supply, transmission, and financial matters.

During March 1980, members of the Eastern Kansas Municipal Energy Agency joined the NWKPA and changed their name to KMEA. The study authorized by the Eastern Kansas Municipal Energy Agency has been combined with the NWKPA study and a complete report on all the municipal systems will be accomplished.

OUTLOOK

Supplemental facilities will be built as determined by the results of the power supply and transmission study. They plan to purchase an 84-MW share of the 280-MW coal-fired generating unit to be constructed by Sunflower Electric Cooperative. The municipal group has an offer to purchase up to 63 MW of the Wolf Creek Nuclear Plant. Additionally, they will study the option of purchasing capacity from the Jeffrey Energy Center. The purchase of this generating capacity and the addition of interconnecting facilities will be financed by the sale of bonds. These municipal systems presently pay the expenses of the organization through a fee assessment estimated according to the energy consumed by their customers.

MUNICIPAL ELECTRIC SYSTEMS OF OKLAHOMA (MESO)

COMPOSITION

A group of municipal systems, which had been previously coordinating their interests in energy needs and legislation, officially formed MESO in January 1978. This organization started with 16 municipalities as members and now has 47. One municipality is located in Arkansas but receives its energy requirements from SPA. City council approval is required for a municipal system to join this group.

The governing body is an 11-member board of directors elected by the member systems. An executive director and full-time staff are maintained in offices in Oklahoma City, Oklahoma. Member systems pay an annual fee in proportion to the energy used by their customers to support the organization.

MAJOR ELEMENTS OF COORDINATION

The MESO provides the members with such varied services as assistance in obtaining power contracts, wheeling agreements, and supporting legislation to allow joint ownership and financing of facilities.

OUTLOOK

MESO is expected to continue to provide its members with present services and to obtain the most economical energy for its members.

LOUISIANA ENERGY AND POWER AGENCY (LEPA)

COMPOSITION

In 1979 the Louisiana Legislature enacted a law providing for the establishment of LEPA. Membership in this agency is only available to Louisiana municipal electric systems. Municipalities planning to join must receive approval through city elections. Six cities became members of LEPA through referendums on December 8, 1979.

COORDINATING AGREEMENTS

The law allows for the appointment of a board of directors and the selection of a permanent staff by board members; the members will contract with LEPA for power supplies and energy requirements. The LEPA is provided the authority to construct generation and transmission facilities and may also join in the construction of such facilities with investor-owned utilities to provide services to their members. Financial provisions allow LEPA to sell revenue bonds to pay for these activities as well as administrative operations of the agency.

OUTLOOK

This organization may possibly provide its members with 50 MW of SPA power in 1982 with additional amounts to be made available at a later time. Also, LEPA is expected to develop central dispatch to allow the most economic use of existing and proposed generating facilities and delivery of future power requirements.

COMMITTEE ON POWER FOR THE SOUTHWEST (CPSW)

COMPOSITION

The CPSW consists of 177 rural electric cooperatives, 58 municipal electric utility systems, and 13 associate member systems. The members' utilities are located throughout six States in the southwest United States. The CPSW offices are located in Tulsa, Oklahoma.

MAJOR ELEMENTS OF COORDINATION

Originally this committee functioned through voluntary participation by the members to ensure adequate power supplies to both rural cooperatives and municipalities in the southwest region. In mid-1975, steps were taken to become a formal organization with a paid full-time staff. This approach was the result of additional power from SPA becoming limited and the rapidly changing fuel supply situation. The formal establishment of this committee resulted in the appointment of a board of directors and employment of a full-time executive secretary and staff.

OUTLOOK

The goals of this committee are to plan and promote activities that will provide adequate power supplies to the preference customers in the area. This goal is accomplished by participating in national, regional, and State issues affecting energy resources available to its members. Individuals with professional expertise can testify before both congressional committees and legislative bodies responsible for setting policies on the development of generation and transmission facilities. Assistance in financing, advanced technologies, and benefits of regional interties is provided to system members. They also promote the passage of legislation that would authorize the sale of revenue bonds to finance the construction of facilities necessary for pooling operations. These supporting activities and lobbying efforts have resulted in considerable benefits to members' system.

ELECTRIC COOPERATIVE ORGANIZATIONS

COMPOSITION

In Kansas, all 38 electric cooperatives belong to the Kansas Electric Cooperatives, Inc. Numerous committees in this incorporated group serve the needs and functions of rural electric cooperatives.

An organization such as this exists in each State in the South Central Region. The organizations and the cities in which they are located are as follows:

Arkansas Electric Cooperatives, Inc., Little Rock, Arkansas
Association of Louisiana Electric Cooperatives, Inc., Baton Rouge, Louisiana
Electric Power Association of Mississippi, Jackson, Mississippi
Missouri Electric Cooperatives, Jefferson City, Missouri
Oklahoma Association of Electric Cooperatives, Oklahoma City, Oklahoma
Texas Electric Cooperatives, Inc., Austin, Texas

MAJOR ELEMENTS OF COORDINATION

Planning committees study power and energy requirements as well as transmission and distribution needs. This organization also supports the members' interest by lobbying for laws affecting their operations.

Numerous other committees provide information and programs including lineman and job-safety programs, meter service centers, and automated billing service. All the varied interests of electric cooperatives are administered through this umbrella agency.

OUTLOOK

These organizations are expected to continue to serve their members as circumstances dictate.

CHAPTER 6

THE SOUTHWESTERN POWER ADMINISTRATION AS A COORDINATING ORGANIZATION

DESCRIPTION

The Southwestern Power Administration (SPA) was established by the Secretary of the Interior under responsibilities delegated by Section 5 of the Flood Control Act of 1944. This agency, with headquarters in Tulsa, Oklahoma, was designated as the marketing agent for 23 hydroelectric projects constructed by the U.S. Army Corps of Engineers. Two additional installations, the Harry S. Truman and the Clarence Cannon Projects, are scheduled to be in operation in late 1979 and 1982, respectively. Other projects are under study. At present, the installed hydroelectric generating capacity being marketed by SPA is 1917 MW. When the two projects under construction are completed, the total installed capacity will be 2135 MW.

This system includes over 1636 miles of transmission lines and 31 major substations delivering power from the projects. Additional deliveries are made through other utilities' transmission networks. The combination of hydroelectric generating plants and transmission facilities is known as the Southwestern Federal Power System (SFPS). The project marketing area of this agency is located in parts of the six-State areas of Arkansas, Kansas, Louisiana, Oklahoma, Missouri, and Texas.

COORDINATING FUNCTIONS

The energy from the SFPS is marketed to rural electric cooperatives, municipals, Government installations, industrial customers, and private utilities. In 1976 a new System Control and Data Acquisition (SCADA) was installed at the control center in Springfield, Missouri. This improved the reliability and operating efficiency of the SFPS system.

The revenues received from the sale of power and energy by the SFPS are used to cover the cost of operations as well as for amortizations of Federal investment in hydroelectric projects and related facilities. Power rates established by SFPS and charged to its customers are subject to approval by FERC.

On August 4, 1977, Congress and the President enacted the Department of Energy Organization Act. This act placed SPA within the new Department of Energy under the Assistant Secretary for Resource Applications.

RELATIONS WITH OTHER UTILITIES

Initially, the sales contracts provided for the delivery of firm power to many SFPS customers. These arrangements have been revised over the years because of the increased energy needs of the customers and the limited supply available from the hydroelectric projects. Peaking power is now marketed and additional requirements are obtained from other generating resources by their customers. In times of low streamflow, supplemental energy supplies have been purchased by SFPS from other major utilities in the region to meet the needs of its customers.

Arrangements for banking energy with other utilities during high streamflow conditions to be repaid later have proven successful. Additional benefits can be attained if the energy banking arrangement can be expanded. Some pooling activities can be developed with the G&T cooperatives and generating municipals by improving system controls that provide the most economic utilization of resources available. However, future expansion of pooling agreements is considered limited because of limited capacity available from the hydroelectric projects.

CHAPTER 7
REGULATION AS A FACTOR IN REGIONAL ELECTRIC COORDINATION

FEDERAL POWER ACT

The Federal Power Act, as first enacted in 1935 and as amended since then, has had a profound effect on coordination of electric power operations. Section 202* of the Act is entitled "Interconnection and Coordination of Facilities; Emergencies; Transmission to Foreign Countries;" and part (a) of this section directed the Commission "to divide the country into regional districts for the voluntary interconnection and coordination of facilities for the generation, transmission, and sale of electric energy...." Also, it stated "It shall be the duty of the Commission to promote and encourage such interconnection and coordination within each such district and between such districts." Part (b) of Section 202 empowers the Commission, under certain conditions, to order interconnections between public utilities, and under part (c), the Commission can order temporary interconnections during national emergencies.

Under the authority of the Federal Power Act, the Federal Power Commission and its successor agency since 1977, promoted voluntary interconnections and, during national emergencies, has ordered temporary interconnection of facilities. Interconnection studies have been made and distributed to all concerned including State Public Service Commissions; power market surveys have been conducted with the aid of the industry; extensive investigations of major power failures have been completed. Moreover, the Commission staff has participated in many industry oriented committees and seminars organized to promote coordination and allied purposes such as reliability and power supply economies.

The natural growth of the electrical power industry from the small individually operated plants at the turn of the century, together with the impetus of activities under the Federal Power Act, economies of scale, and the mutuality of interests and problems has led to the well interconnected systems of today. The degree of interconnection and coordination has been influenced by population density and consequent load concentration; this is evidenced by the highly sophisticated large central dispatch operations of the more populous areas along the East Coast as compared to the 20 or so isolated municipals in the South Central Plains States.

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*All functions authorized by Section 202, except part (b) thereof, were transferred from the Federal Power Commission to the Department of Energy by the "Department of Energy Organization Act," which became effective October 1, 1977.

Coordination within the region has advanced, along with the rest of the Nation, because of influences of natural growth, the Federal Power Act, and the evolution of operating sophistication. However, the coordination process is still evolving because municipal operations remain isolated in the more sparsely settled areas of the region. Also, most of the utilities in the State of Texas have chosen not to interconnect across State lines and, thus, this area operates isolated from other portions of the Nation. This isolation is influenced by regulation in that part of the motivation to avoid interstate operations is also the desire to avoid regulation under the Federal Power Act.

OTHER RECENT REGULATORY ACTS AFFECTING COORDINATION

The major purpose of the Power Plant and Industrial Fuel Use Act of 1978 is to promote the use of coal, or other alternate fuels, as primary energy sources, in lieu of natural gas or petroleum, in both electric powerplants and other major fuel-burning installations. This Act, together with previous rulings and acts, and the accompanying national policy to decrease dependence on petroleum and natural gas has resulted in some conversions in the region. However, the major emphasis has been to phase out the use of these fuels because it is economically prohibitive to convert natural gas and petroleum firing to coal. Some smaller industrial plants have been converted.

The Public Utility Regulatory Policies Act of 1978 (PURPA) has as one of its major purposes "a program providing for increased efficiency of use of facilities and resources by electric utilities." Title II--Certain Federal Energy Regulatory Commission and Department of Energy Authorities--is devoted almost entirely to furthering this cited purpose. For example, Section 202 amends the Federal Power Act to promote and allow ready implementation of desirable interconnections; Section 203 gives certain authority over wheeling to the FERC; Section 204 gives general provisions governing interconnection and wheeling authority; and part (a) of Section 205, which is entitled "Pooling," exempts electric utilities, under certain conditions, from provisions of State laws prohibiting pooling. Also, this report, as noted in the Foreword, is being prepared in partial compliance with Section 205(b). Other provisions of the act also promote coordination. PURPA will have a major effect on expansion of pooling activities in the South Central Region and throughout the United States.

OTHER FEDERAL REGULATORY ACTIVITIES

The Nuclear Regulatory Commission regulates the construction and operation of all nuclear reactors and other facilities that are directly associated with nuclear generating plants. The

Environmental Protection Agency prescribes pollution abatement regulations requiring compliance by electric utilities. In those cases where a major Federal activity is involved, such as construction of an electric facility on federally owned or licensed lands or by the use of Federal funds (i.e., REA loans for generation or transmission), an evironmental impact statement (EIS) must be prepared in compliance with the National Environmental Policy Act. Also, an EIS is required in connection with construction of a nuclear generating plant and for those steam-electric facilities that require application to the U.S. Army Corps of Engineers to erect cooling water intake facilities in navigable waters. The rates charged by SPA for electric power from Federal hydroelectric projects in the region are subject to approval by the FERC; however, this approval authority does not extend to enforcement. The SEC exercises jurisdiction over electric utilities in the issuance of security consolidations and accumulations of assets. The REA under its loan authority for REA cooperatives exercises financial control over those cooperatives.

ROLE OF STATE REGULATORY COMMISSIONS

RESPONSIBILITIES OF STATE COMMISSIONS

Each State in the region has a regulatory commission that has authority over the rates charged by its private electric utilities. Each State may have slightly different jurisdictional responsibilities reflecting statutes of the particular State. For instance, some States have jurisdiction only over privately owned electric utilities, whereas others have jurisdiction that extends to cooperatives and to publicly owned electric utilities. Another major difference is the extent to which a State commission has jurisdiction over facility sitings. Some States have siting commissions separate from the commission that has jurisdiction over rates and conditions of service. Regulatory authority over power interchanges between utilities in interstate commerce is exercised by FERC.

Because the regulatory authority of State commissions is most often limited to jurisdiction over private electric utilities, the primary emphasis of the commissions' regulatory activities is in the interests of the electric consumers served by the private electric utilities. However, in most States, this normally represents a large majority of its citizens and usually the publicly or consumer-owned distribution utilities and their customers benefit from commission actions in a secondary way. The commissions are charged with ensuring that actions taken by utilities under their jurisdictional control do not result in rates that are higher than necessary for adequate and reliable service. State statutes do not specifically authorize a commission to order coordinated action by all electric utilities serving the State.

Nevertheless, through their general powers, the commissions could effectively require certain power pooling arrangements. For example, a commission may be authorized to annually forecast electric loads and develop a plan for meeting those needs. Certificates of Public Convenience and Necessity may only be granted if the generating unit in question fits the plan. The plan, in turn, may be required to consider power pooling. In addition, a commission may have "general supervision over the rates charged and the service rendered." Possibly, a commission could refuse to grant Certificates of Public Convenience and Necessity and could adjust the rate base and expenses in rate cases (and fuel adjustment cases) as if pooling were occurring, even if the commission could not directly order power pooling.

Most States must approve the construction of generating plants within their State as meeting the requirements of public convenience and necessity. In contrast, some commissions may not exercise jurisdiction over the siting of transmission lines. Thus, it appears that the present level of regulatory authority exercised by State commissions generally includes the ability of those commissions to cause, directly or indirectly, the minimization of costs of generation and transmission through the pooling of production and transmission facilities of utilities under their jurisdiction. By participating in joint board activities, these commissions can cause an areawide pooling of the resources.

CONCERNS OF REGULATORS RELATING TO POWER POOLING

Within the bounds of their responsibilities and authorities, State regulators have the following concerns related to interutility power transfer.

1. Regulators are required to promote adequate, economical, and reliable electric service; power pooling has been demonstrated to be capable of both helping and hindering the achievement of each of these objectives, depending upon the circumstances
2. Regulators can encourage their utilities to form operating pools with other utilities but will be reluctant to do so if, (a) reliability suffers, (b) service quality suffers, or (c) jurisdictional utilities and their ratepayers do not gain a proper share of the benefits
3. Pricing of energy and capacity transfers can encourage or discourage pooling; pricing methods must ensure that "middle men" in multiutility transfers do not receive profits inappropriate to their costs and thus inhibit savings by companies that are separated by one or more intervening utilities; energy charges and transmission-use charges must truly reflect the impact upon each company involved; consideration should be given to the development of simple methods of negotiating power transfers so that buying utilities can contract directly with selling utilities without having to have a chain of two-party contracts from contiguous utility to contiguous utility

4. Regulators are required by statute to allow only reasonable expenses to be used in setting rates; contracts for purchased power must be beneficial to ratepayers or they may be disallowed by regulators; pooling contracts must be administered in such a manner to allow regulators to be able to examine and determine the flow of benefits in cost, service quality, and reliability
5. One of the goals of pooling is to reduce the required generation plant; however, pooling arrangements must not inhibit the planning of individual utilities for future service systems, because it is the individual utilities who are responsible to their regulators for adequate service; individual utilities must either construct adequate facilities or enter into binding agreements on the joint construction of facilities to ensure the capability to provide continued economical service in the event of dissolution of the pool
6. The replacement of fuel used in energy transfers must be equitable; a sending utility should not be allowed or required to use its fuel stocks, especially nuclear fuel and compliance coal, unless compensation is sufficient to cover the replacement cost of those stocks; pricing is not particularly difficult if the fuels used can be immediately replaced on the spot market; however, if the fuels are taken from long-term contract and have the effect of shortening the contract by using fuels that would be used to serve the orginating utility's customers in later years, then the estimated discounted nominal cost of replacing that power in the future is the proper cost; otherwise, the ratepayers of the originating company will pay higher electricity prices than necessary; on the other hand, care must be taken to ensure that excess profits are not built into fuel prices and that the receiving ratepayers gain an equitable share of the benefits; in energy shortages, a ratepayer who has funded larger inventories over the years would be disadvantaged by transferring his stocks to another utility to benefit customers who have not so paid
7. A multitude of differing regulatory requirements can inhibit the successful pooling of generation and transmission; issues of principal concern to a single State or small group of States might best be determined by a common board composed of representatives from the affected State commission(s), utilizing the FERC for technical assistance as necessary; if the affected State(s) can develop arrangements that are acceptable to themselves and consistent with their regulatory authority, then Federal involvement is not necessary; the regulatory requirements of individual State commissions, together with those of FERC, must be closely coordinated; joint FERC-State discussions and action might improve the resolutions of some issues

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STATE COMMISSION ACTIONS

It is in the interest of the ratepayers served by the State commissions to aid in the study and appropriate development of coordinated planning, construction, and operation of bulk-power supply facilities. State commissions can aid the process through (1) innovative ratemaking incentives that inherently recognize the benefits achieved through pooling, (2) generic cases to consider the impact of an efficient pooling system, and (3) joint board activities with other States and FERC. Additionally, FERC should encourage and support individual State regulatory and legislative initiatives that encourage power pooling when it is economically justified.

CHAPTER 8
POTENTIAL BENEFITS OF INCREASED REGIONAL COORDINATION

GENERAL

Absolutely no doubt exists that the coordination of power operations--termed power pooling, joint planning or whatever it may be called--will be beneficial to all concerned in terms of economies, increased reliability, and environmental effects, recognizing that the extent of practical economical coordination is governed by the size and relative location of the facilities involved. For example, it is not economical as yet to interconnect some of the isolated municipals in the Central Plains States because of the size of the load and distance to potential interconnecting systems. Also, regulatory factors--either prohibitive or inhibitive--may enter into decisions as to interconnection and coordination.

In any event, the general beneficial effects of coordination have been recognized since the innovation of central station service--witness the legislative history and the passage of the Federal Power Act in 1935 and specifically Section 202 of that act as described in the previous chapter. Also, subsequent legislation, particularly Title II of the Public Utilities Regulatory Policies Act of 1978, is specifically designed to foster and encourage increased coordination.

A comparison of Figures 2 and 3, showing electrical transmission networks in 1948 and 1977 respectively, dramatically exhibits the increase in coordination that could only have been brought about by recognition of the beneficial effects thereof. The near constant and in some cases decreasing unit cost of electrical energy to the ultimate consumer during the 30-year period from 1940 to 1970, coincident with a general increase in prices for other commodities and services, was assisted in many situations by an expanding degree of coordination throughout the country.

The task force members stated almost uniformly that quantification of the benefits of coordination was difficult on an after-the-fact basis because it would require the creation of an alternative, completely isolated set of systems. However, members added that each and every existing coordination agreement involving specific operations, interconnections, and contractual exchanges had been economically justified in advance--also that agreements and contracts were modified or suspended from time to time as dictated by economic circumstances. For example, a recently proposed simple interconnection of an isolated municipal in the region was estimated to produce a savings of about $4 million over an 18-year period.

An example of modification of a coordination arrangement is the recently announced decision to reduce the seasonal exchange of capacity between SCEC and the TVA. This agreement, consummated during the sixties, postponed the construction of 3000 MW of generating capacity and saved an estimated $100 million in capital expenditures. In addition, it created a backbone transmission system that enhanced reliability, permitted emergency transfers of power in bulk quantities, and provided for economy energy interchanges. Similar statements of fact can be made for many coordination agreements and allied arrangements that have taken place in the region over the years and that will, in most cases, continue to produce future benefits.

In view of the above described situation, the potential benefits of increased regional coordination are discussed below for each of the broad categories of such benefits in a general way only.

RESERVE SAVINGS

One of the major benefits of coordinated operations is the reduction in reserve requirements. The SPP and ERCOT presently maintain reserves on the order of 15 percent and consideration is being given to increasing this in view of the phasing in of new larger coal, lignite, and nuclear units. However, it is important to note that this range of reserve capacity is considerably less than that required for isolated operations.

SURPLUS CAPACITY SAVINGS

The strong high-voltage transmission systems existing in the SPP and ERCOT currently permit the ready disposal, on a firm basis, of surplus capacity that is temporarily available because of the phasing in of large units.

CAPACITY INVESTMENT SAVINGS

Coordination makes possible the staggering of units between systems, thus allowing installation of larger units and the gaining of some benefit because of economy of size.

In addition, coordination encourages and allows joint ownership of units, a practice that becomes especially important, from a unit investment standpoint, for smaller utilities who can thus participate in ownership of much larger, more economical units than they could build on their own.

ECONOMIC DISPATCH

The MSU is the only coordination system in the region practicing total central dispatch; however, other large systems, such as MOKAN, can achieve dispatch near optimal because of their size and the extensive transmission grid.

ECONOMY ENERGY INTERCHANGES

Economy energy interchanges are closely allied with economic dispatch and most of the larger systems in the region practice such interchanges on a system-to-system basis and a "split-the-savings" payment arrangement. Smaller systems also participate in such exchanges wherever possible. The dollar savings resulting from such exchanges are considerable but are not available on a total basis. For example, the CEPL and WETU report that, since 1973, they have exchanged roughly 2,900,000 MWh of energy resulting in a savings of $4,436,290 to CEPL and correspondingly an equal savings to WETU.

SEASONAL DIVERSITY EXCHANGE

Coordination has resulted in a 1500-MW seasonal diversity exchange of capacity between the TVA and SCEC for the past 10 years or more. This exchange is being reduced because of a decrease in diversity, but the 500-kV backbone transmission grid constructed to implement the exchange remains to create future benefits in the form of increased reliability and transfers of emergency power.

RELIABILITY

The increased reliability brought about by a properly designed and closely monitored transmission grid, such as those existing in the SPP and in ERCOT, are very difficult to evaluate on a monetary basis. However, vital nonmonetary considerations are associated with adequate reliability of power systems such as the potential injurious effects on the health, safety, and general welfare of persons; the possible impairment of the national defense; and the community and human concern of multitudes of people.

WHEELING

Coordinated operations permit arrangements for wheeling of power to otherwise isolated customers. For example, SPA is charged with the responsibility of giving preference to publicly owned utilities, such as cooperatives, in the sale of hydroelectric power generated at Federal dams. This is accomplished, where necessary and possible, by arranging for the "wheeling" of such power over privately owned transmission lines. This practice is expected to continue, thus avoiding duplication of transmission facilities.

POWER UTILIZATION

The hydroelectric power available to SPA for marketing is, in general, peaking power that is not suitable for serving the entire requirements of a system such as a preference customer. Consequently, exchange arrangements have been made with privately owned utilities to absorb the peaking power into their systems and serve the preference customers with system load-factor power from their own system. Also, during flood periods, coordinated operations permit the larger systems in the region to absorb all of the dump energy generated by Federal hydroelectric projects. These practices will continue and the benefits will increase proportionately as the costs of nonrenewable resources increase.

OPTIMIZED PLANNING

Coordinated operations result in optimum sizing of generating units and transmission additions. Also, the airing and discussion of mutual problems associated with operation and planning leads not only to better understandings between different segments of the industry, but also, in many cases, to optimized problem solution.

CHAPTER 9
IMPEDIMENTS TO INCREASED REGIONAL COORDINATION

INTRODUCTION

Several factors tend to inhibit the completion of additional coordinating arrangements and the formation of additional power pools in the South Central Region. Some of these factors, such as the philosophical attitudes associated with the "public versus private" controversy, have diminished and will disappear with time, retirement, increasing association, and mutuality of problems. Others, created by new laws and regulations and by parochial concerns intensified by shortages, may be on the increase. A number of these factors are discussed individually in the following sections of this chapter.

FINANCIAL ISSUES

An important factor in joint construction of power facilities is that all parties to the agreement must contribute their fair share of the cost as required during the construction period. Regulatory delay in granting of rate increases or delays in authorization of funds by governing bodies can interfere with an orderly construction program; such interference can increase costs and thus inhibit parties from entering into joint agreements. In some areas, refusal to grant requested rate increases has resulted in the cancellation of generating and transmission facilities either already under construction or scheduled for construction.

Another factor creating problems in gaining administrative approval to enter into joint construction is the desire of some taxing authorities to retain construction of major power facilities within their own jurisdictional boundaries.

Financial problems experienced by most utilities--both investor- and public-owned--may result in restraints in constructing new facilities for increased coordination. The increased costs of generating units, transmission lines, and appurtenances causes financial strain on all types of utilities in providing facilities for additional coordination. Since the early 1970's when many utilities held favorable bond ratings, a general decline in ratings has occurred. Similarly, today the common stock of many companies is selling below book value. The net effect of the current financial posture for utilities is increased costs for financing capital projects and substantial postponement of new facilities, with an adverse impact on coordination and adequacy of the future bulk-power supply system. Solutions to the financial dilemma facing utilities today are neither simple nor can they be implemented rapidly. Nonetheless, regulatory agencies need to recognize that increased coordination in the future is being determined by today's decisions. In this regard, timely and adequate rate action is necessary to generate enough revenues soon enough to carry out the problems associated with coordination and to meet future electric energy needs.

LEGAL ISSUES

One legal restraint often encountered in pooling arrangements is the prohibition of the investment of construction funds in facilities outside the boundaries of an entity's particular service area or corporate limits. However, this inhibiting factor is lessening because of changes in laws. Another factor is the existence of contractual agreements prohibiting operation in interstate commerce (a subject that is the central point in a formal proceeding presently before FERC).

Another issue inhibiting coordination is the legal interpretation of the definition, under Title V of the Power Plant and Industrial Fuel Use Act of 1978, of a qualifying facility that would be allowed to burn natural gas for peaking purposes after 1990. Under current interpretations, a coordinating entity, such as TMPA that operates under central dispatch, would not qualify although its member municipals would. Thus, each municipal would have to burn the allotted gas in its own units even though, if the allotment were transferable to the coordinating entity TMPA, the gas could be more efficiently utilized in the most efficient plant of the members' systems.

ENVIRONMENTAL PROBLEMS

One pooling impediment is the requirement for preparation of an environmental impact statement either as a prerequisite associated with a Federal loan or required by State law. The time required for preparation of such a statement has, in some cases, prevented joint participation in construction of a particular power facility because the facility would be required for use before the environmental impact statement could be prepared and approved. Another environmental factor is the designation of certain areas as "non-attainment areas," thus effectively prohibiting electric uitlities from either constructing or participating in the construction of new generating facilities in those areas. In addition, environmental concerns of local regulatory officials may prevent construction of jointly owned generating facilities in one area to benefit, even if only temporarily, customers in another area. Furthermore, some systems show an increasing general reluctance to enter into joint agreements for construction requiring Federal permits or Federal funds that would entail delays and costly studies associated with statutory and environmental requirements. This situation may be alleviated somewhat by legislation now under consideration to accelerate the environmental requirement process.

Although the region has not experienced significant problems concerning the building of transmission lines, particularly extra-high voltage, in the past, the region must consider the environmental or aesthetic opposition that could be raised by "public interest" groups in the future course of certification procedures before regulating bodies. Opposition to transmission lines usually comes from local groups who are directly impacted by the particular line route. These groups do not recognize the role of transmission in the overall reliability and economy of bulk-power supply systems operations and have little understanding of the inherent economies of scale provided by EHV transmission lines.

REGULATORY PROBLEMS

As a result of the National Environmental Policy Act, Clean Air and Water Acts, and the National Energy Act, adequacy and reliability of future coordinated systems power supply are being significantly impeded by regulations developed and implemented by State and Federal regulatory agencies. Delays are common during the construction of powerplants on account of State and Federal regulations, especially in the coal-fired and nuclear plants. The "Prevention of Significant Deterioration" (PSD) standards for coal plants can cause considerable delays in construction until the courts decide the issues in many cases. In some parts of the United States, additional delays are imposed on transmission line construction by regulatory action and litigation.

In some cases, a high rate of turnover in regulatory officials and staff generates difficulties in obtaining regulatory approval for an agreed upon joint endeavor. These turnovers discourage applicants and result in undue delay because of the time involved for officials and staff to gain necessary expertise.

Another deterrent to power pooling is the fact that regulatory commissioners, in general, have a legal background and in most cases, lack the essential technical expertise to appreciate and understand the intricacies involved in power pooling.

PHILOSOPHIC ISSUES

One major impediment to coordination and power pooling has been the differences in basic beliefs concerning the best type of electric utility ownership and management; this difference is commonly termed the "public versus private" power controversy. This mutual distrust as to the motives and integrity of opposing forces has contributed to a lack of cooperation. Furthermore, individual citizens and citizen governing bodies may lack understanding of the operations of electric utilities and this has led to difficulties in cooperative undertakings. However, during the last decade, a combination of increasing loads in some areas and decreasing loads in others, shortages of fuel, higher fuel prices, difficulties of construction, and financial problems--which have been suffered by all concerned--has tended to submerge former suspicions and animosities in favor of joint enterprises to solve common problems. Thus, this major impediment to pooling is being rapidly eliminated.

ADMINISTRATIVE PROBLEMS

Joint enterprises in utility construction and coordination in general are deterred by the multiplicity of problems associated with (1) the different permitting procedures required of the several parties involved, and (2) the difficulties involved in gaining agreements on essential contractual terms among several parties possessing differing organizational backgrounds and requirements.

UNCERTAINTIES AS TO FUTURE COSTS, ENERGY SUPPLIES, REGULATORY ACTIONS, ETC.

Utility planners are faced with a multitude of uncertainties affecting the decisions to make adequate provisions for future power supplies. Among such uncertainties are increases in costs for both equipment and fuel, the availability of adequate energy supplies, and the effects of increasing regulatory actions. In general, the rate of load growth has decreased since the impact of the oil embargo in 1974. This has been occasioned partly by conservation efforts adopted by all classes of customers, especially industrial, but it also has been caused in part by milder weather conditions and occasional recessional periods. Even through the load requirements are increasing at a lesser rate, the escalating costs for facilities, fuel, labor, and supplies all result in a net increase in cost for new power supply facilities. The effect of these uncertainties is to delay in some cases additional coordination measures because of the uncertainty concerning continued economic feasibility with rapidly changing costs and imposition of new regulatory measures.

EXPOSURE TO ADDITIONAL RISKS

The South Central Region is subject to severe weather extremes characterized by tornadoes, hurricanes along the coast, hurricane storms causing severe inland flooding, and ice and snow storms extending as far south as central Texas. All of these climatic possibilities enter into decisions that must be made by utility management when considering the advisability of placing reliance on extended transmission lines--especially EHV--interconnecting with other utilities or remote generating stations.

CHAPTER 10
REGIONAL OPPORTUNITIES FOR INCREASED COORDINATION

INTRODUCTION

Most improvements in financial and operating advantages available from power pooling in the South Central Region are currently being realized and opportunities for further coordination will be examined and adopted in the future as dictated by economics or circumstances. Widespread activity in the field of coordination is evidenced by the joint construction of power facilities either underway or being initiated throughout the region. As loads and costs of facilities increase, the trend toward joint ownership of generating units probably will continue to increase also. Mutuality of problems in financing, permitting, and fuel procurement will continue to contribute to this trend and bring about either greater opportunities, or increased incentives, or both for isolated municipals to interconnect with neighboring systems.

Agreements will have to be reached with major utilities concerning wheeling arrangements whereby municipal or other smaller entities can exchange power with each other; however, such arrangements must acknowledge the fact that surplus transmission line capacity cannot always be utilized for firm power transactions and may, at certain times, be required for stability purposes. Moreover, regulatory authorities must recognize and allow for payment of fair compensation for wheeling services. Here again, mutuality of problems may contribute to the consummation of mutually beneficial and satisfactory arrangements.

As more and more generation is produced by coal, lignite, and nuclear fuel, the concept of "coal-by-wire" practices to save oil will become of less importance. Less opportunity for advantageous pooling practices will exist with most generation using similar fuel.

More sophisticated communication, data gathering facilities, and practices, including exchange of pertinent operating data, are being considered by both the SPP and ERCOT as well as by other coordinating entities. These intiatives as well as several other prospects for increased coordination are discussed in the following parts of this chapter.

UTILITY INVESTIGATIONS

MOKAN BROKERING SYSTEM

MOKAN, which has been developing for a number of years, does not have central economic dispatch facilities, because of the lack of economic justification. However, on a one-to-one basis, the utilities in the pool have coordinated operations in the way of power transfers and economy energy. In 1975, the FPC's Fort Worth office issued a staff report entitled "Study of Full Interconnection and Coordination of Electric Systems Located in FPC Power Supply Areas 29 and 34." One recommendation of the report was to investigate the possibility of central dispatching for all the electric utilities in the MOKAN area. In addition, the report surveyed the potential benefits and possible means of improving the interconnection and coordination of all the electric systems in the MOKAN area.

The executive committee of MOKAN has given directions to its operating committee to implement an operating brokerage system in 1980. Under this system, hourly pricing of economy energy would be disseminated and energy would be either bought or sold between members of the pool accordingly. With this innovation in mind and if economically justified, central economic dispatching could be developed as a natural evolutionary process for MOKAN. The central dispatching center could eventually become the vehicle to handle the details and operation of the brokerage system.

ERCOT BROKERING SYSTEM

In the ERCOT area, studies are now underway to determine the feasibility of instituting a "brokerage" system for the utilities in the region. The major utilities in ERCOT were, in effect, directed by the Public Utility Commission of Texas to coordinate with the smaller entities on the surplus capacity created during the past few years because of the change from natural gas plant generation to coal and lignite plants. The Economic Regulatory Administration has instituted a series of seminars for interested utilities to discuss the "brokerage" type system and ERCOT is participating in these seminars.

SOUTHWEST POWER POOL INITIATIVES

SPP has recently approved installation of a computer with data terminals to each control area. This system will enable the pool office to provide, for example, up-to-the-minute reports concerning systems with reserve capacity and costs involved if a pool member should suffer a deficiency in reserve capacity.

A task force of chief executives has also been appointed from the pool members to conduct an in-depth review of the existing pool coordination agreement. Their goal is to ensure greater reliability and coordination for member systems and to determine effective methods of enforcing operating policies formulated by the pool members. Also, an in-depth review of the pool coordination agreement was conducted and a new agreement was recently adopted. The immediate effect of the change in the agreement was simplification and to give more authority to the board of directors, thus allowing rapid response to requests for action.

In summary, with the impetus of ever increasing regulatory restrictions, the SPP is steadily moving toward increased coordination of generation and transmission operations, increased planning activities for the entire pool, expansion of the pool staff, and installation of a data-acquisition network to more closely coordinate pool member systems' operations on an hour-by-hour basis.

The ultimate in power pooling is a single control area with one entity controlling the pool generation regardless of ownership. This type of operation does not appear practical in SPP because of the diverse ownership structures involved and the extremely large land area covered by the member systems.

CENTRAL AND SOUTH WEST CORPORATION INTERCONNECTION STUDIES AND APPLICATION FOR ORDER

The CSW, consisting of four member companies, has two member companies in SPP (PSOK and SOEP) and two member companies in ERCOT (CEPL and WETU). On May 4, 1976, WETU began serving customers across State lines in Oklahoma. This resulted in a split-up of the ERCOT system, one part being interstate ERCOT or the West ERCOT group and an intrastate ERCOT group or the East ERCOT group. This separation of ERCOT lasted until May 4, 1977, when the Public Utility Commission of Texas (PUC) ordered the former ERCOT systems to reconnect as previously in the ERCOT system and discontinue serving customers in Oklahoma.

During the year's separation in ERCOT, several suits and countersuits were filed in courts by CSW and the remaining intrastate utilities in Texas. In February 1979, after the passage of the National Energy Act, CSW filed an application* with FERC seeking generally to (1) exempt the CEPL and WETU from certain provisions of the PUC Order in Docket 14, and (2) require the ERCOT companies to operate with the CSW companies that would be interconnected in interstate commerce with SPP. CSW had economic studies prepared under several modes of operation showing the feasibility of interconnecting the ERCOT companies with the SPP. In turn, Houston Lighting and Power Comapny had a study prepared demonstrating the desirability of ERCOT remaining intrastate along with WETU and the CEPL.

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*Docket No. EL 79-8.

The application before the FERC by the CSW companies is still pending. A joint study has been inaugurated by systems of the ERCOT and SPP, with FERC and ERA contributing technical expertise for the study. No decision will be made on the application to FERC by CSW until the cooperative study has been completed.

JOINT ACTION PROJECT PROPOSALS

Some of the most notable joint action projects in the South Central Region are the combined efforts of two or more utilities constructing coal and nuclear plants together. In some cases, a municipality may build a larger coal plant than the city can utilize at the time and sell the surplus capacity to other municipalities for several years until the initial municipality load builds up to a point where the capacity is needed by the owner. Numerous cases of large energy centers being constructed by major utilities and percentages of the capacity being sold to municipalities and REA groups on a cost basis are common in the region. Large nuclear plants are usually financed by several utilities joining together in a common endeavor.

Transmission lines are usually financed by utilities pooling their resources within their own service areas and distributing the cost of EHV transmission lines over a large area. In the region, county lines or parish lines are usually the boundary for service areas so that each utility benefited by the EHV transmission line will assume cost in those parishes or counties. In other cases, where a utility builds a plant and needs to wheel power through an existing 345-kV grid system to reach its owners, the total cost of the EHV transmission lines connecting the plant to the grid system will be borne by the owner utility. Each case is usually negotiated between the constructors of new plants and the existing owners of the present 345-kV grid system. Division of costs depends entirely on which utility or utilities receives the maximum benefits from the newly constructed plant.

Appendix A lists the joint ownership generating units and the participating utilities for each in the region.

OTHER INVESTIGATIONS

ERA MOKANOK STUDY

At the present time, the Fort Worth office of the Economic Regulatory Administration is conducting a study covering the Missouri, Kansas, and Oklahoma utilities ("MOKANOK"), which includes the major utilities in both Oklahoma and the MOKAN Pool area. This study should provide quantitative information and data on what benefits may or may not be available from increased coordination in the "MOKANOK" area. One of its objectives is to quantify the amounts of oil and natural gas savings by utilizing fuel from large coal and nuclear plants projected for the area.

CHAPTER 11
MEMBERS' VIEWS ON PROSPECTS FOR INCREASED COORDINATION, CRITICAL ISSUES, ETC.

Each task force member was invited to submit his views on prospects for increased coordination, critical issues, etc. in the region.

Mr. Sylvan J. Richard submitted the following material under the title "Advantages of Interconnection" for the city of Lafayette, Louisiana:

> The City of Lafayette, like most Louisiana cities that own and operate an electric utility, has operated isolated for many years prior to the mid-1970's. Some cities like Lafayette had a limited emergency tie with the area utility.
>
> Many benefits and advantages have been gained in the past several years because of the city's ability to interconnect with area utility companies. One major advantage is a much less reserve requirement. Since its interconnection with Gulf States Utilities and Central Louisiana Electric Company, the City of Lafayette is required to maintain only 16 percent reserves. Prior to its interconnection with these utilities, the City had to maintain reserves capable of replacing its largest unit operating within the system. Being interconnected also provides the City with a market for any surplus power and energy; the interconnection provides service schedules for transmission of power and energy to other systems.
>
> Lafayette presently has a large surplus capacity resulting from the considerable reserves required prior to interconnection. The City is presently selling over 100 MW of power and energy to utilities and municipalities within Louisiana; with its present transmission service schedules, it is negotiating to supply power and energy to two cities in Mississippi. Money generated by surplus sales has enabled the City to lower its cost to its customers in Lafayette.
>
> Another major benefit of interconnections is the ability to participate in generating projects located outside the City of Lafayette. The City is presently participating in a 50-50 joint venture with Central Louisiana Electric Company involving a coal-fired

> generating unit at Boyce, Louisiana. This venture is made possible through the interconnections and existing transmission schedules that will allow delivery of power and energy to the City of Lafayette beginning in 1982.
>
> This type of interconnection and the expansion of power pooling could benefit most other municipals in Louisiana in the same manner as Lafayette. Transmission of hydroelectric energy to several municipals in Louisiana from SPA is to take place during the summer of 1980 and transmission service is being negotiated.

Mr. Phillip Hanson submitted the following with regard to "Future Outlook" for the municipals in Kansas and Missouri:

> The municipals in the Kansas and Missouri areas under the definition of a power pool 'an amalgamation of two or more utility systems that strive to obtain the maximum practical benefits obtainable from coordinated planning and operation of their combined bulk electric power supply facilities' are striving to establish legislation that will permit them to enter into joint action contracts.
>
> In Kansas, joint action legislation has been in existence as of January 1977. This legislation permits two or more municipalities to jointly form a municipal energy agency establishing parameters for two options, purchase-sale and/or wheeling agreements with neighboring utilities. The agency is under the jurisdiction of the Kansas Corporation Commission, a regulatory body. The agency was permitted for the pooling on a wholesale basis only and is not permitted retail sales. The agency is not permitted to build coal slurry pipelines or build coal gasification plants. The agency is permitted to transfer energy outside of the state. It also is permitted, under the Commission, the aid of unified financing.
>
> In Missouri during the 79th General Assembly and the second regular session in 1978, HB No. 1126, the 'Act,' the Joint Municipal Utility Commission Act, became law. This joint contract becomes effective when five contracting municipalities have duly executed it. The purpose of this joint contract and of the Commission created are to obtain for the contracting municipalities electric power and energy required to meet the needs in the most feasible and economic manner. The efficient wheeling, pooling, generation, transmission, and distribution to meet power and energy requirements for the municipalities is important to meet the needs of these municipalities and also for their survival.

The availability as well as the expanding cost of fuel make the joint action in a pool concept with other SPP members an absolute necessity.

The creation of new agencies such as PURPA (Public Utility Reliability Policy Act) for utilities generating 500,000,000 kWh per year and NECPA (National Energy Consumer Policy Act) for utilities generating 750,000,000 kWh per year, place additional burdens on these municipalities making it necessary to utilize every available means and benefit from pooling to continue their operation.

This brief statement exposes only the tip of the iceberg of the issues facing municipal utilities to continue operation and without the coordinated effort of pooling they will not be able to survive.

The EPA policy for non-attainment areas under the Clean Air Act, as amended in 1977, part D defining 'Non-attainment Areas' resulted in the Missouri Air Conservation Commission redesignating the primary and secondary boundaries on October 25, 1978, for the Region VII which is the Kansas City area including Independence. This action was based on information compiled from the summary of air sampling data for 1975, 1976, and 1977 and PEDCo model on 1976 emissions.

The designated area for primary TSP (Total Suspended Particulate) represents 75 micro grams per cubic meter on a 24-hour average and the secondary TSP area represents 60 micro grams per cubic meter on a 24-hour average. The City of Independence falls in the secondary non-attainment area. The law reads that no major emitting facility may add any additional Total Suspended Particulate into the atmosphere. This in turn prohibits the City of Independence from adding any additional generation to meet its capacity needs.

Legislation was not available to buy any portions of Wolf Creek Nuclear Station or the Iatan Station when offered by the Kansas City Power & Light Company so this left the City of Independence only one alternative to make preparations to meet her capacity needs by 1981. The City negotiated with N. W. Electric Co-op to purchase their Missouri City power station which is 13 miles due north of the City of Independence Bruce Valley generating plant. This plant has been shut down since a fire five years ago and will take an extensive refurbishing to prepare it for operation by October 1981 to meet the City of Independence's needs by that time. This supplemental capacity will only meet the needs until about 1985. According to present-day forecasting for load growth which again, as repeated earlier, emphasizes the importance of power pool stability and availability of capacity from the pool for its members, who are

> limited and prevented by new emission standards and additional state and Federal restrictions, from planning for engineering and financing needs to provide capacity for the years that lie ahead.

Mr. James H. Frampton submitted the following paper entitled "A G&T Cooperative View of the Southwest Power Pool."

> From its instigation in 1942 by 11 investor-owned companies to supply power to critical defense industries in the South Central area, the Southwest Power Pool remained primarily an organization of investor-owned elements of the utility industry.
>
> Prior to the Southwest Power Pool Coordination Agreement of December 17, 1969, some public power systems were supplying data to the pool for planning and coordination studies, but were not full-fledged dues-paying members and did not have a voice or voting rights in the governing body.
>
> In the December 17, 1969 agreement, the Southwest Power Pool was expanded to include municipalities and publicly owned systems as dues-payment members with voting rights on the governing board. Three G&T Cooperatives were signatories to this agreement--Associated Electric Cooperative in Missouri, Arkansas Electric Cooperative in Arkansas, and Western Farmers Electric Cooperative in Oklahoma. Other cooperatives and municipalities have since joined, and the total pool membership now stands at forty (40) members.
>
> Until recently the pool had been primarily a rather loose amalgamation of corporations and public bodies with the common interest of power supply to their respective areas. The Southwest Power Pool office in Little Rock, Arkansas, is staffed with a small but highly effective staff. It has served primarily in the role of a data gathering, coordinating and reporting organization for the pool without any, or very few, direct data or communication channels to the individual pool members other than phone contact.
>
> The pool is presently studying the feasibility of installing a mini-computer in the pool office with data terminals to each control area. This would enable the office to provide up-to-the-minute reports as to which system may have reserve capacity, and the cost in the event a pool member suffers a deficiency.
>
> A task force of chief executives has also been appointed to conduct an in-depth review of the existing pool agreement with the goal of assuring greater reliability for member systems and to determine effective methods of enforcement for operating policies.

System planning for the pool has been quite effective. Due to the extremely large geographic area which the SPP covers, the planning function is divided into four groups of contiguous systems. A total pool study is made by the pool staff and a task force between December and January. In March the individual groups meet to run studies on their particular area using equivalents established by the pool study. These studies to date, have been very effective for system planners of the individual systems.

The G&T's in the pool all have interconnection contracts with the neighboring systems. In Western Farmers case these include: OG&E, PSO, WTU, and SWPA. We also have interchange contracts with six municipalities within the WFE control area.

In the case of the investor-owned utilities these contracts provide for exchanges of economy energy, short-term firm, and emergency service. Perhaps due to closely comparable fuel costs and heat rates, only minor exchanges of economy energy have taken place. Emergency service has proven a valuable agreement for both contracting parties.

A much closer working relationship has developed in recent years between the G&T cooperatives and their investor-owned neighbors. Although friction still exists between investor-owned and publicly owned systems, as is to be expected, the relationship between the operating personnel of both organizations has developed to excellent standards of cooperation and mutual assistance in day-to-day operations.

In summary, Generation and Transmission Cooperatives feel that the Southwest Power Pool as it exists today has provided improved reliability and continuity of service to individual systems over a large geographic area. With the impetus of ever-increasing regulatory restrictions, the pool is moving steadily toward increased coordination of generation and transmission requirements, increased planning activities for the entire pool, possible expanson of the pool staff, along with a data acquisition network to more closely coordinate pool activities on an hour-by-hour basis.

Mr. Jack C. Wells submitted the following statement on behalf of the Central and South West Corporation:

The need to realize economies available from increased coordination among electric systems is very basic to the planning of the Central and South West System. The end of the era of cheap and plentiful natural gas in the Southwest brought home to utilities in this area what systems elsewhere had been

> discovering: there are major savings through coordination which can help control customer costs. What CSW has done in response is no mystery to anyone in the utility industry. In order to coordinate its own operations fully, it must interconnect all of its System companies. Studies it has conducted show that interconnection could permit it to achieve net savings in excess of $2 billion over the next 20 years. The opposition to interstate operation on the part of other systems in Texas has led to extensive litigation over the merits of interconnection.
>
> This report does not appear to be an appropriate forum for resolving these issues, though it obviously makes an important contribution both to suggesting what can be realized through coordination and to illustrating the reluctance of many in the industry to depart from familiar if outmoded operating patterns. It is noteworthy that of all the cross-examination and rebuttal evidence in the CSW litigation, not one piece disputes the economies of pooling. There is argument over what pools there should be and argument over the electrical effects of interconnecting Texas with other systems, but no contention that electrical coordination will not produce benefits.
>
> One of the great advantages of holding company systems is that they can enforce cooperation among their members. CSW believes that economic and regulatory pressures will inevitably force even nonaffiliated companies to coordinate. What the lines or boundaries of these pools will be cannot now be prescribed. No doubt these must develop flexibly through the process of negotiation and study among utility managements. CSW believes that interconnection of ERCOT and SWPP will open the way for utilities in the Southwest to take maximum advantage of the opportunities for coordination that the future presents.

Mr. R. E. Corder submitted the following dissertation as to an interpretation of PURPA, an interpretation which tends to inhibit coordination:

> Coordinated pool operation is universally acknowledged to offer as one of its benefits the optimum utilization of fuel resources since it can insure that the most efficient generating equipment blend is always utilized to serve the pool load.
>
> The member cities of the Texas Municipal Power Agency have encountered an impediment to their power pool operations in what they perceive as a rather unusual place; the Power Plant and Industrial Fuel Use

Act of 1978, a legislative act with the stated purpose of 'conserving natural gas and petroleum.'

As part of their joint operations, the TMPA members will find it necessary to operate their existing gas fired generating equipment in a peaking capacity into the 1990's. The Fuel Use Act makes available several avenues to allow such operation. The most feasible of these from the TMPA's standpoint is Title V of the Act, the systems compliance option, utilized in concert with the member's ongoing economic dispatch mode of operation. The problem, recently recognized, is that TMPA cannot qualify under Section 504.2 of the regulations as 'any person who owns, controls, rents, or leases' the existing power plant units of the member cities and is therefore not eligible as the appropriate entity to have a system compliance option plan approved.

On a practical, day-to-day basis it is clear that the TMPA exercises the necessary control. In a strict, legalistic interpretation, however, the member cities remain the owners and operators of their own existing systems and are the only entities eligible to file plans under Title V. Each of these plans would, however, cover only the individual units and plants of that particular city.

At stake is the ability of the TMPA system to utilize gas at its maximum efficiency through future economic dispatch. Much of the benefit of economic dispatch is already realized by the cities' operations and a system compliance plan which failed to recognize and provide for the transfer of gas (as contractually permitted by the common fuel supplier) would mean a retreat from natural gas and oil conservation already obtained. In short, the current SCO gas allowance regulations do not recognize the unique situation of TMPA and other joint action agencies. These regulations, if followed, would force inefficient gas/oil-fired generating units to operate after the more efficient units have used up their allowed gas volumes. Such operation is counter to conservation goals and would increase oil consumption and cost on the TMPA system.

APPENDIX A
JOINTLY OWNED GENERATING PLANTS
SOUTH CENTRAL REGION

Appendix A is a list of all existing or planned jointly owned electric generating plants in the South Central Region. The percentage and capacity of each plant unit is listed showing the portion each utility owns.

Additional data are listed giving the fuel type in use or planned, and for those units not yet in operation, the scheduled in-service date is shown.

The plants are listed alphabetically under two subheadings--Southwest Power Pool Area and Electric Reliability Council of Texas. The utility codes designating ownership are those in general use on FERC Regional Facilities Maps and in FERC publications.

Plant	State	Unit No.	Ownership	Fuel	Percent Ownership	Capacity (MW)	Status
Southwest Power Pool Area							
Arkansas Lignite Energy Center	AR	1	ARPL	Lignite	60.0	450	Future Jan. 89
			AREC		35.0	263	
			JONE		5.0	37	
Big Cajun 2	LA	3	CAJN	Coal	50.0	270	Future Jan. 83
			GUSU		50.0	270	
Big Cajun 3	LA	1	CAJN	Lignite	75.0	405	Future Jan. 85
			GUSU		25.0	135	
Big Cajun 3	LA	2	CAJN	Lignite	75.0	405	Future Jan. 85
			GUSU		25.0	135	
Big Cajun 4	LA	1	CAJN	Lignite	75.0	405	Future Jan. 86
			GUSU		25.0	135	
Black Fox	OK	1	PSOK	Uranium	60.9	700	Future Jan. 85
			ASEC		21.7	250	
			WEFA		17.4	200	
		2	PSOK	Uranium	60.9	700	Future Apr. 88
			ASEC		21.7	250	
			WEFA		17.4	200	
Dolet Hills	LA	1	CELE	Lignite	50.0	320	Future Mar. 86
			SOEP		50.0	320	
Flint Creek	AR	1	SOEP	Coal	50.0	264	In service
			AREC		50.0	264	
Grand Gulf	MS	1	MIPO	Uranium	90.0	1,125	Future Apr. 82
			SMEP		10.0	125	

Grand Gulf (Continued)		2	MIPO	Uranium	90.0	1,125	Future Apr. 85
			SMEP		10.0	125	
Iatan	MO	1	KACP	Coal	70.0	455	Future Mar. 80
			STJO		18.0	117	
			EDME		12.0	78	
Independence	AR	1	ARPL	Coal	56.5	418	Future Jan. 83
			AREC		35.0	259	
			JONE		5.0	37	
			CONW		2.0	15	
			WESM		1.0	7	
			OSCE		0.5	4	
	AR	2	ARPL	Coal	56.5	418	Future Jan. 85
			AREC		35.0	259	
			JONE		5.0	37	
			CONW		2.0	15	
			WESM		1.0	7	
			OSCE		0.5	4	
Jeffrey	KN	1	KAPL	Coal	64.0	436	In service
			KAGE		20.0	136	
			MIPU		8.0	54	
			CETU		8.0	54	
		2	KAPL	Coal	64.0	436	Future June 80
			KAGE		20.0	136	
			MIPU		8.0	54	
			CETU		8.0	54	
		3	KAPL	Coal	64.0	436	Future June 83
			KAGE		20.0	136	
			MIPU	Coal	8.0	54	
			CETU		8.0	54	
		4	KAPL	Coal	64.0	436	Future June 85
			KAGE		20.0	136	
			MIPU		8.0	54	
LaCygne	KN	1	KACP	Coal	50.0	400	In service
			KAGE		50.0	400	

Plant	State	Unit No.	Ownership	Fuel	Percent Ownership	Capacity (MW)	Status
LaCygne (Continued)			KACP	Coal	50.0	320	In service
		2	KAGE		50.0	320	
River Bend	LA	1	GUSU	Uranium	70.0	658	Future Apr. 85
			CAJN		30.0	282	
		2	GUSU	Uranium	70.0	658	Future Sept. 89
			CAJN		30.0	282	
Rodemacher	LA	2	CELE	Coal	50.0	265	Future Jan. 82
			LAFA		50.0	265	
White Bluff	AR	1	ARPL	Coal	58.0	429	Future June 80
			AREC		35.0	259	
			JONE		5.0	37	
			CONW		2.0	15	
			WESM		1.0	7	
		2	ARPL	Coal	58.0	429	Future May 81
			AREC		35.0	259	
			JONE		5.0	37	
			CONW		2.0	15	
			WESM		1.0	7	
Wolf Creek	KN	1	KAGE	Uranium	41.5	477	Future Apr. 83
			KACP		41.5	477	
			KAEP		17.0	196	
Electric Reliability Council of Texas							
Big Brown	TX	1	TUSI[1]	Lignite	100.0	593	In service
		2	TUSI	Lignite	100.0	593	In service

Coleto Creek	TX	1	CEPL	Coal	100.0	550	Future Dec. 79
		2	CEPL	Coal	77.7	268	Future Jan. 88
			WETU		22.3	77	
Comanche Peak	TX	1	TUSI	Uranium	100.0	1,150	Future Jan. 81
		2[2]	TUSI	Uranium	100.0	1,150	Future Jan. 83
Forest Grove	TX	1	DAPL	Lignite	20.0	150	Future Jan. 84
			TEES		60.0	450	
			TEPL		20.0	150	
Gibbons Creek	TX	1	TMPA[3]	Lignite	100.0	400	Future June 82
Karnack	TX	1	CEPL	Coal	77.7	268	Future Jan. 88
			WETU		22.3	77	
Martin Lake	TX	1	TUSI[4]	Lignite	100.0	793	In service
		2	TUSI[4]	Lignite	100.0	793	In service
		3	TUSI[5]	Lignite	100.0	750	In service
		4	TUSI[5]	Lignite	100.0	750	Future Jan. 85
Monticello	TX	1	TUSI[6]	Lignite	100.0	593.4	In service
		2	TUSI[6]	Lignite	100.0	593.4	In service
		3	TUSI[7]	Lignite	100.0	793.0	In service
Oklaunion	TX	1	PSOK	Coal	7.8	50	Future Jan. 87
			CEPL		23.3	149	
			WETU		61.1	391	
			SOEP		7.8	50	
San Miguel	TX	1	BREP	Lignite	50.0	200	Future Oct. 80
			SOTE		50.0	200	

Plant	State	Unit No.	Ownership	Fuel	Percent Ownership	Capacity (MW)	Status
S. K. Seymour	TX	1	AUST	Coal	50.0	275	In service
			LOCR		50.0	275	
		2	AUST	Coal	50.0	275	Future June 80
			LOCR		50.0	275	
		3	LOCR	Lignite	100.0	400	Future Apr. 87
South Texas	TX	1	AUST	Uranium	16.0	200	Future Apr. 82
			CEPL		25.2	315	
			HOLP		30.8	385	
			SAAN		28.0	350	
		2	AUST	Uranium	16.0	200	Future Apr. 83
			CEPL		25.2	315	
			HOLP		30.8	385	
			SAAN		28.0	350	
Twin Oak	TX	1	TEPL	Lignite	75.0	562	Future Jan. 84
			ALCOA		25.0	188	
		2	TEPL	Lignite	75.0	562	Future Jan. 86
			ALCOA		25.0	188	

[1] DAPL, TEES, and TEPL each have 33.3 percent.
[2] 6.2 percent to TMPA and 3.8 percent to BREP.
[3] BRYN, DENT each have 20 percent, GARL 50 percent and GRUD 10 percent.
[4] DAPL 20 percent, TEES 20 percent, TEPL 60 percent.
[5] DAPL 25 percent, TEES 45 percent, TEPL 30 percent.
[6] DAPL 20 percent, TEES 30 percent, TEPL 50 percent.
[7] TEES 50 percent, TEPL 50 percent.

APPENDIX B
UTILITY INTERCONNECTIONS AND POWER SUPPLIERS
SOUTH CENTRAL REGION

Appendix B is a list of all the electric utilities in the South Central Region. The capacity, 1978 peakload, major interconnections, and power suppliers are shown for all the utilities with generation. Radial interconnections and power suppliers are shown for the remaining utilities. The utility codes shown are those in general use on FERC Regional Facilities Maps and in FERC publications.

The utilities are listed under two subheadings--Southwest Power Pool Area and Electric Reliability Council of Texas. Utilities with over 100 MW of installed capacity are listed alphabetically and the isolated systems are included regardless of their installed capacity. The remaining utilities, which purchase all their energy needs or have less than 100 MW of installed capacity, are listed alphabetically under the utility they are interconnected with--municipal systems first, followed by State agencies, Federal, and then rural electric cooperatives. If a system in this catagory is interconnected with more than one supplier, then the system is listed only once under the supplier first appearing alphabetically. The remaining interconnections, or suppliers, or both are shown under the respective headings of that system.

The total 1978 installed capacity and peakload are shown for each subarea. To arrive at these figures, estimates were made in cases where the actual figures were not available (NA).

Name of Utility	State	Code	Installed Capacity 1978 MW	Peakload 1978 MW	Major Interconnections	Radial Interconnections	Purchases Power From
Southwest Power Pool Area			52,560	43,601[1]			
Alexandria, City of	LA	ALEX	174	126		CELE	CELE
Arkansas Elec. Coop.	AR	AREC	316	807	ARPL		ARPL, ARMP, SOEP, SPA
Augusta Lgt., Wtr. & Gas	AR					AREC	AREC, SPA
Arkansas Valley Elec. Coop.	AR					SOEP	AREC, OKGE, SOEP
Ashley-Chicot Elec. Coop.	AR					AREC	AREC
C & L Elec. Coop.	AR					AREC	AREC
Carroll Elec. Coop.	AR					ARPL, SOEP, SPA	AREC
Clay County Elec. Coop.	AR					ARMP	AREC
Craighead Elec. Coop.	AR					AREC	AREC
First Elec. Coop.	AR					ARPL	AREC
Ouachita Elec. Coop.	AR					ARPL	AREC
Ozarks Elec. Coop.	AR					SOEP	AREC, KAMO
Petit Jean Elec. Coop.	AR					ARPL	AREC
Riceland Elec. Coop.	AR					ARPL	AREC
Rich Mountain Elec. Coop.	AR					SOEP	AREC
South Central Ark. Elec. Coop.	AR					AREC, SOEP	AREC
Southwest Ark. Elec. Coop.	AR					ARPL, SOEP	AREC
Woodruff Elec. Coop.	AR					AREC, ARPL	AREC
Arkansas-Missouri Pwr. Co.	MO	ARMP	247	331	ARPL, AREC, ASEC, MAEP, SPA, UNCE		AREC, ARPL, ASEC, CABE, LOPL, MIPO, MIPO, NEMD, NEOP, UNCE
Campbell Lgt. & Pwr. Co.	MO	CABE				ARMP	ARMP
Thayer, City of	MO					ARMP	SPA
Arkansas Pwr. & Lgt. Co.	AR	ARPL	3,322	3,654	ARMP, ASEC, EPDE, LOPL, MIPO, NOEP, OKGE, SHMP, SOEP, SPA, TVA		ARMP, ASEC, EMDE LOPL, MIPO, NEOP, OKGE, SPA, TVA
Benton Mun. Lgt. & Wtr.	AR	BENT	9	32		ARPL	ARPL
Conway Corp.	AR	CONN	11	49		ARPL	ARPL
Hope, City of	AR					ARPL	ARPL
Jonesboro City Wtr. & Lgt.	AR	JONE	21	100		SPA	ARPL, SPA
North Little Rock, City of	AR					ARPL	ARPL
Osceola, City of	AR					ARPL	ARPL
Paragould Lgt. Plt. Comm.	AR	PARA	5	46		SPA	ARPL, SPA
Prescott Wtr. & Lgt.	AR					ARPL	ARPL
West Memphis, City of	AR					ARPL	ARPL
Farmers Elec. Coop.	AR					ARPL	ARPL
Mississippi County Elec. Coop.	AR					ARPL	ARPL, AREC
North Arkansas Elec. Coop.	AR					ARPL, ARMP, SPA	AREC, ARPL, ARMP
Ashland Wtr. & Lgt.	KS	ASHL	5	3			(None)
Associated Elec. Coop.	MO	ASEC	1,0462	8032	ARMP, CEEP, KAGE, MAEP, NEMA, NOEP, SHMP, UNEC		PSOK, SPA
Barry Elec. Coop.	MO					ASEC	KAMO
Barton County Elec. Coop.	MO					ASEC	KAMO
N.W. Elec. Pwr. Coop.	MO	NOEP			ASEC, EMDE, SPA		ASEC
Atchison-Holt Elec. Coop.	MO					NOEP	NOEP
Rock Port Bd. of Pub. Wks.	MO	ROKP	6	3		Atchison-Holt Coop.	Atchison-Holt Coop.

Name of Utility	State	Code	Installed Capacity 1978 MW	Peakload 1978 MW	Major Interconnections	Radial Interconnections	Purchases Power From
N.W. Elec. Pwr. Coop. (Continued)							
Farmers Elec. Coop.	MO					NOEP	NOEP
Chillicothe, City of	MO					Farmers Coop.	Farmers Coop.
Gallatin, City of	MO					Farmers Coop.	Farmers Coop.
Meadville, City of	MO					Farmers Coop.	Farmers Coop.
Pattonburg, City of	MO					Farmers Coop.	Farmers Coop.
Nodway-Worth Elec. Coop.	MO					NOEP	NOEP
Northwest Missouri Elec. Coop.	MO					NOEP	NOEP
Albany, City of	MO	ALWP	4	4		Northwest Mo. Coop.	Northwest Mo. Coop.
Easton, City of	MO					Northwest Mo. Coop.	Northwest Mo. Coop.
Stanberry, City of	MO	STAN	3	NA		Northwest Mo. Coop.	Northwest Mo. Coop.
Platte-Clay Elec. Coop.	MO					NOEP	NOEP
Cameron, City of	MO					Platte-Clay Coop.	Platte-Clay Coop.
West-Central Elec. Coop.	MO					KACP, MIPU, NOEP	NOEP
New-Mac Elec. Coop.	MO					ASEC	KAMO
Northeast Oklahoma Elec. Coop.	OK					ASEC, GRRD, KAMO, PSOK, Tulsa Wtr. & Swrg. Dept. Lake Region Elec. Coop. Verdigris Valley Coop.	ASEC, GRRD, KAMO PSOK, Tulsa Wtr. & Swrg. Dept.
Tulsa Wtr. & Swrg. Dept.	OK					Northeast Okla. Coop.	Northeast Okla. Coop.
Osage Valley Elec. Coop.	MO					ASEC, BUTL	KAMO
Butler Lgt. & Wtr.	MO	BUTL	6	8		Osage Valley Coop.	Osage Valley Coop.
Ozark Elec. Coop.	MO					ASEC, KAMO, Crane, MO., Lockwood, Mo.	KAMO
Crane, City of	MO					Ozark Elec. Coop.	Ozark Elec. Coop.
Lockwood Mun. Elec.	MO					Ozark Elec. Coop.	Ozark Elec. Coop.
Sac-Osage Elec. Coop.	MO					ASEC	KAMO
Southwest Elec. Coop.	MO					ASEC, KAMO, SHMP	KAMO, SHMP
White River Valley Elec. Coop.	MO					ASEC, KAMO, SHMP	KAMO, SHMP
M & A Elec. Pwr. Coop.	MO	MAEP	9	9	ARMP, MLUC, SPA, UNEC		ASEC
Pemiscot-Dunklin Elec. Coop.	MO					MAEP	MAEP
Bellville Lgt. & Pwr.	KS	BELV	13	NA			(None)
Burlingame Pwr. & Lgt.	KS	BUGA	4	NA			(None)
Cajun Elec. Pwr. Coop.	LA	CAJU	230	196	GUSU		(None)
Beauregard Elec. Coop.	LA					GUSU, CELE	CAJU
Bossier Rural Elec. Membership	LA					CELE, LOPL, SOEP	CAJU, Tex-La Coop.
Claiborne Elec. Coop.	LA					LOPL	CAJU
Concordia Elec. Coop.	LA					LOPL	CAJU
Dixie Elec. Membership Corp.	LA					GUSU, LOPL	CAJU
Jefferson Davis Elec. Coop.	LA					GUSU	CAJU
Northeast Louisiana Pwr. Coop.	LA					LOPL	CAJU
Pointe Coupee Elec. Coop.	LA					CELE, GUSU, LOPL	CAJU, CELE, GUSU, LOLP
New Roads Lgt. & Wtr.	LA	NEWR	10	NA		GUSU, Pointe Coupee Coop.	GUSU, Pointe Coupee Coop.
South La. Elec. Coop.	LA					CELE, LOPL	CAJU
Teche Elec. Coop.	LA					CELE	CAJU
Valley Elec. Membership Corp.	LA					CELE, LOPL, SOEP	CAJU, Tex-La Coop.
Washington St. Tammany Coop.	LA					CELE, LOPL	CAJU

Name of Utility	State	Code	Installed Capacity 1978 MW	Peakload 1978 MW	Major Interconnections	Radial Interconnections	Purchases Power From
Central Kansas Pwr. Co.	KS	CEKP	87	160	CETU, KAPL		KAPL
Colby, City of	KS	COLB	19	10		CEKP, Great Plains Coop.	CEKP, Great Plains Coop.
Ellis, City of	KS	ELLI	6	3		CEKP	CEKP
Oakley, City of	KS	OAKY	8	8		CEKP	CEKP
Great Plains Elec. Coop.	KS					CEKP, SUNC	SUNC
Northwest Kan. Elec. Coop.	KS					CEKP, SUNC	SUNC
Herndon, City of	KS					Northwest Kan. Coop.	Northwest Kan. Coop.
Norton-Decatur Coop.	KS					CEKP, CETU	CETU, SUNC
Western Coop. Elec. Assn.	KS					CEKP, SUNC	SUNC
Central Louisiana Elec. Co.	LA	CELE	1,357	1,050	GUSU, LOPL, SOEP		LOPL, SARA
Boyce, Town of	LA					CELE	CELE
Elizabeth, Town of	LA					CELE	CELE
Franklin, City of	LA	FRAN	25	15		CELE	CELE
Morgan City, City of	LA	MOCI	77	43		CELE	CELE
Natchitoches, City of	LA	NATC	53	33		CELE	CELE
Opelousas, City of	LA	OPEL	50	28		CELE, GUSU	CELE, LAFA
Central Tele. & Utils. (WPD)	KS	CETU	478	387	CEKE, CEKP, KAGE, KAPL, PICA, SOPS, SUNC, WHEI		CEKP, KAGE, KAPL, SOPS
Anthony, City of	KS	ANTH	12	9		CETU, Alfalfa Coop.	CETU, Alfalfa Coop.
Attica, City of	KS	ATTI	2	2		CETU	CETU
Beloit, City of	KS	BELO	13	12		CETU	CETU
Cawker, City of	KS					CETU	CETU
Cimarron, City of	KS					CETU	CETU
Coats, City of	KS					CETU	CETU
Glasco, City of	KS					CETU	CETU
Glen Elder, City of	KS					CETU	CETU
Hoisington, City of	KS	HOIS	2	7		CETU	CETU
Holyrood Lgt. & Wtr. Dept.	KS					CETU	CETU
Isabel, City of	KS					CETU	CETU
Jamestown, City of	KS					CETU	CETU
Lucas Lgt. Dept.	KS					CETU	CETU
Luray Wrt. & Lgt.	KS					CETU	CETU
Mankato, City of	KS					CETU	CETU
Montezuma, City of	KS					CETU	CETU
Osborne Municipal Lgt.	KS	OSBO	7	4		CETU	CETU
Pratt, City of	KS	PRAT	25	NA		CETU	CETU
Iuka Lgt. Pwr. & Dist.	KS					PRAT	PRAT
Russell, City of	KS	RUSS	18	15		CETU	CETU
Tipton Elec. Dist. Sys.	KS					CETU	CETU
Washington, City of	KS	WASH	5	3		CETU	CETU
Arkansas Valley Elec. Coop.	KS					CETU, KAPL	CETU, KAPL
C & W Elec. Coop.	KS					CETU, KAPL	CETU, KAPL
CMS Elec. Coop.	KS					CETU, Tri-County Coop.	CETU
Meade Municipal	KS	MEAD	9	4		CMS Elec. Coop.	CMS Elec. Coop.
Central Kans. Elec. Coop.	KS	CEKE	11	49		CETU, KAPL, LACR	CETU, LAGR
LaCrosse, City of	KS	LARC	6	8		CEKE	CEKE
Radium Mun. Elec.	KS					CEKE	CEKE
Seward, City of	KS					CEKE	CEKE

Name of Utility	State	Code	Installed Capacity 1978 MW	Peakload 1978 MW	Major Interconnections	Radial Interconnections	Purchases Power From
Central Tele. & Utils. (WPD) (Continued)							
Jewell Mitchell Coop.	KS					CETU	CETU
NCK Elec. Coop.	KS					CETU	CETU
Ninnescah Elec. Coop.	KS					CETU, KAPL	CETU
Smoky Hill Elec. Coop.	KS					CETU, KAPL	CETU, KAPL
Sumner-Cowley Coop.	KS					CETU, KAGE	CETU, KAGE
Victory Elec. Coop.	KS					CETU, PICA, SUNC	CETU, PICA, SUNC
Clayton, Town of	NM	CLAT	7	4			(None)
Crosbyton, City of	TX	CROS	5	3			(None)
Empire District Elec. Co.	KS, MO	EMDE	505	447	ARPL, ASEC, GRRD KAGE, WOEP, SPA		ARPL, ASEC, KACY, KAGE, KCPL, MIPU, PSOK, TVA, SPA
Chetopa, City of	KS					EMDE	EMDE
Mt. Vernon, City of	MO					EMDE	EMDE
Monett, City of	MO					EMDE	EMDE
Sekan Elec. Coop.	KS					EMDE, KAGE	EMDE, KAGE
Grand River Dam Authority	OK	GRRD	499	587	EMDE, PSOK, SOEP		PSOK
Chelsa, City of	OK					GRRD	GRRD
Claremore, City of	OK					GRRD	GRRD
Collinsville, City of	OK					GRRD	GRRD
Cushing, City of	OK	CUSH	18	20		GRRD	GRRD
Miami, City of	OK					GRRD	GRRD
Pawnee, City of	OK					GRRD	GRRD
Pryor, City of	OK					PSOK	GRRD
Sallisaw, City of	OK					GRRD	GRRD
Skiatook, City of	OK					GRRD	GRRD, SPA
Stilwell, City of	OK					GRRD	GRRD
Tahlequah, City of	OK					GRRD	GRRD
Wagoner, City of	OK					GRRD	GRRD
Chelsa Municipal Authority	OK					GRRD	GRRD
KAMO Elec. Coop.	OK	KAMO			PSOK, SPA		ASEC, GRRD, OKGE, PSOK
Central Rural Elec. Coop.	OK					GRRD, KAMO, OKGE	KAMO
Cookson Hills Elec. Coop.	OK					GRRD, OKGE	KAMO
Gans, Town of	OK					Cookson Hills Coop.	Cookson Hills Coop.
East Central Okla. Elec. Coop.	OK					GRRD, OKGE, PSOK	KAMO, WEFA
Indian Elec. Coop.	OK					KAMO, OKGE, PSOK	KAMO, OKGE, PSOK
Kiamichi Elec. Coop.	OK					KAMO, OKGE, PSOK, WEFA	KAMO, WEFA
Lake Region Elec. Coop.	OK					GRRD, North East Okla. Coop.	KAMO
Verdigris Valley Elec. Coop.	OK					GRRD, KAMO, North East Okla. Coop.	GRRD, KAMO, PSOK
Goodland, City of	KS	GOOD	21	NA			(None)
Greensburg Mun. Pwr. & Lgt.	KS	GRBU	7	4			(None)
Gulf States Util. Co.	LA, TX	GUSU	6,178	5,138	CAJU, CELE, LOPL, MIPR, MIPO, SPA, SARA		SARA, SPA
Abbeville, Town of	LA					GUSU	GUSU
Caldwell, City of	LA					GUSU	GUSU
College Station, City of	TX					BRYN, GUSU	BRYN, GUSU

Name of Utility	State	Code	Installed Capacity 1978 MW	Peakload 1978 MW	Major Interconnections	Radial Interconnections	Purchases Power From
Grand River Dam Authority (Continued)							
Erath, Town of	LA					GUSU	GUSU
Gueydan, Town of	LA					GUSU	GUSU
Jasper, City of	TX					GUSU	GUSU
Kaplan, Town of	LA					GUSU	GUSU
Kirbyville Lgt. & Pwr.	TX					GUSU	GUSU
Liberty, City of	TX					GUSU	Sam Rayburn Dam Coop.
Livingston, City of	TX					GUSU	Sam Rayburn Dam Coop.
Newton, City of	TX					GUSU	GUSU
Plaquemine, City of	LA	PLAQ	31	23		GUSU	GUSU
Rayne, Town of	LA	RAYN	13	15		GUSU	GUSU
Vinton, Town of	LA					GUSU	GUSU
Welsh, Town of	LA					GUSU	GUSU
Houston County Elec. Coop.	TX					GUSU, TEPL	GUSU, TEPL
Jasper-Newton Elec. Coop.	TX					GUSU, TEPL	Sam Rayburn Dam Coop. Tex-La Elec. Coop.
Mid-South Elec. Coop.	TX					BREP, GUSU, TEPL	GUSU, BREP Sam Rayburn Dam Coop. Tex-La Elec. Coop.
Sam Rayburn Dam Elec. Coop.	TX					GUSU, SPA	SPA
Hill City, City of	KS	HICI	7	5			(None)
Houma Lgt. & Wtr.	LA	HOUM	110	51		LOPL	LOPL
Hugoton, City of	KS	HUGO	13	6			(None)
Independence Pwr. & Wt.	MO	INDN	295	188	KCPL, MIPU		KCPL, MIPU
Jetmore Pwr. & Lgt.	KS	JETM	6	2			(None)
Kansas City Bd. of Pub. Utils.	KS	KACY	642	428	KCPL		KCPL, SPA
Kansas City Pwr. & Lgt.	KS	KACP	2,982	2,051	ASEC, KACY, KAGE, KAPL, MIPU, NOEP, SAJL, SPA SAJL, UNEC		ASEC, KACY, KAGE, KAPL, MIPU, OMPP,
Armstrong, City of	MO					KACP	KACP
Baldwin City Municipal	KS	BALD	6	4		KACP	KACP
Carrolton Mun. Util.	MO					KACP	KACP
Gardner, City of	KS					KACP	KACP
Garnett, City of	KS	GARN	10	6		KACP	KACP
Higginsville, City of	MO	HIGG	2	8		KACP	KACP
Marshall Mun. Util.	MO	MARM	45	30		KACP	KACP
Osawatomie Wtr. & Lgt.	KS		8	6		KACP	KACP
Ottawa Wtr. & Lgt.	KS		25	20		KACP	KACP
Pomona, City of	KS					KACP	KACP
Prescott, City of	KS					KACP	KACP
Slater, City of	MO					KACP	KACP
Coffey County Rural Coop.	KS					KACP, KAPL, KAGE	KACP, KAPL, KAGE
United Elec. Coop.	KS					KACP, KAGE	KACP, KAGE
Kansas Gas & Elec. Co.	KS	KAGE	2,016	1,554	ASEC, CETU, EMDE, KACP KAPL, OKGE, PSOK UNEC, WINF		KACP, NAPL, MIPU, OKGE, OPPD, PSOK
Altamont, City of	KS					KAPL	KAGE
Arcadia, City of	KS					KAGE	KAGE
Arma, City of	KS					KAGE	KAGE
Augusta, City of	KS	AUGU	18	13		KAPL	KAGE

Name of Utility	State	Code	Installed Capacity 1978 MW	Peakload 1978 MW	Major Interconnections	Radial Interconnections	Purchases Power From
Kansas Gas & Electric Co. (Continued)							
Blue Mound Pwr. Dept.	KS					KAGE	KAGE
Bronson Lgt. & Pwr.	KS					KAGE	KAGE
Burlington, City of	KS	BURL	3	NA		KAGE	KAGE
Chanute, City of	KS	CHAN	25	25		KAGE	COFF, KAGE
Coffeyville Mun. Lgt. Dept.	KS	COFF	80	42		KAGE	CHAN, KAGE
Elsmore, City of	KS					KAGE	KAGE
Erie Wtr. & Lgt. Dept.	KS					KAGE	KAGE
Fredonia Mun. Pwr. & Lgt.	KS					KAGE	KAGE
Girard, City of	KS					KAGE	KAGE
Haven Lgt. & Pwr.	KS					KAGE	KAGE
Iola Elec. Sys.	KS	IOLA	21	17		KAGE	KAGE
La Harpe, City of	KS					KAGE	KAGE
Mindenmines Mun. Sys.	MO					KAGE	KAGE
Moran Lgt. Dept.	KS					KAGE	KAGE
Mount Hope Elec. Dept.	KS					KAGE	KAGE
Mulberry Mun. Lgt.	KS					KAGE	KAGE
Mulvane, City of	KS					KAGE	KAGE
Neodesha, City of	KS	NEOD	9	8		KAGE	KAGE
Oxford, City of	KS					KAGE	KAGE
Savonburg Elec. Lgt.	KS					KAGE	KAGE
Wellington, City of	KS	WELL	35	22		KAGE	KAGE
Winfield Mun. Lgt. & Pwr.	KS	WINF	56	34		KAGE	KAGE
Udall, City of						WINF	WINF
Butler Rural Elec. Coop.	KS					KAGE, KAPL	KAGE, KAPL
Caney Valley Elec. Coop.	KS					KAGE	KAGE
Radiant Elec. Coop.	KS					KAGE	KAGE
Sedgwick County Elec. Coop.	KS					KAGE	KAGE
Kansas Pwr. & Lgt. Co.	KS	KAPL	2,184	1,648	CEKP, CETU, KAGE KACP, MCPH, OMPP		KAGE, LARN, MCPH Bowersock Mills Pwr.
Alma, City of	KS					KAPL	KAPL
Axtell Munc. Elec. Dept.	KS					KAPL	KAPL
Bowersock Mills Pwr.	KS	2	2			KAPL	(None)
Centralia, City of	KS					KAPL	KAPL
Chapman, City of	KS					KAPL	KAPL
Clay Center Mun. Lgt. & Wtr.	KS	CLAY	18	13		KAPL	KAPL
DeSoto, City of	KS					KAPL	KAPL
Elwood, City of	KS					KAPL	KAPL
Ellinwood Lgt. & Pwr.	KS					KAPL	KAPL
Enterprise, City of	KS					KAPL	KAPL
Eudora, City of	KS					KAPL	KAPL
Goff, City of	KS					KAPL	KAPL
Herington Mun. Wtr. & Elec.	KS	HERI	10	6		KAPL	KAPL
Hillsboro Mun. Elec.	KS					KAPL	KAPL
Holton, City of	KS	HOLT	14	7		KAPL	KAPL
Horton, City of	KS	HORT	4	3		KAPL	KAPL
Larned Mun. Pwr.	KS	LARN	20	12		KAPL	KAPL
Lindsburg Mun. Lgt. & Wtr.	KS	LIBO	10	NA		KAPL	KAPL
Marion, City of	KS					KAPL	KAPL
Minneapolis, City of	KS	MINN	8	4		KAPL	KAPL

Name of Utility	State	Code	Installed Capacity 1978 MW	Peakload 1978 MW	Major Interconnections	Radial Interconnections	Purchases Power From
Kansas Power & Light Co. (Continued)							
Morrill Mun. Lgt. Sys.	KS					KAPL	KAPL
Muscotah Mun. Elec.	KS					KAPL	KAPL
Netawaka Elec. Lgt. Sys.	KS					KAPL	KAPL
Osage City Mun. Lgt.	KS	OSCY	7	5		KAPL	KAPL
Oswego Lgt. & Wtr.	KS					KAPL	KAPL
Reserve Lgt. Dept.	KS					KAPL	KAPL
Robinson, City of	KS					KAPL	KAPL
St. John, City of	KS	SAJO	4	3		KAPL	KAPL
St. Marys Wtr. & Lgt.	KS					KAPL	KAPL
Sabetha, City of	KS	SABA	11	6		KAPL	KAPL
Scranton, City of	KS					KAPL	KAPL
Seneca Lgt. Dept.	KS					KAPL	KAPL
Severance, City of	KS					KAPL	KAPL
Stafford, City of	KS	STAF	4	3		KAPL	KAPL
Sterling Mun. Lgt. & Wtr.	KS	STER	7	5		KAPL	KAPL
Toronto, City of	KS					KAPL	KAPL
Troy Lgt. Dept.	KS					KAPL	KAPL
Vermillion, City of	KS					KAPL	KAPL
Wamego, City of	KS	WAGO	6	6		KAPL	KAPL
Waterville, City of	KS					KAPL	KAPL
Wathena, City of	KS					KAPL	KAPL
Brown-Atchison Elec. Coop.	KS					KAPL	KAPL
Willis, City of	KS					Brown-Atchison Coop.	Brown-Atchison Coop.
DS&O Elec. Coop.	KS					KAPL	KAPL
Doniphan Elec. Coop.	KS					KAPL	KAPL
Flint Hills Elec. Coop.	KS					KAPL	KAPL
Kaw Valley Elec. Coop.	KS					KAPL	KAPL
Levenworth-Jefferson Coop.	KS					KAPL	KAPL
Lyon County Elec. Coop.	KS					KAPL	KAPL
Nemaha-Marshall Elec. Coop.	KS					KAPL	KAPL
PR&W Elec. Coop.	KS					KAPL	KAPL
Smoky Valley Elec. Coop.	KS					KAPL	KAPL
Twin Valley Elec. Coop.	KS					KAPL	KAPL
Lafayette, City of	LA	LAFA	376	194	CELE, GULF		(None)
Jonesboro, Town of	LA	JONB	17	12		LOPL	LAFA, LOPL
Lincoln, City of	KS	LINC	9	5			(None)
Louisiana Pwr. & Lgt. Co.	LA	LOPL	4,830	3,852	ARPL, CELE, GUSU, MIPR, MIPO, NEOP, SOEP	NEOP, RUST, SARA, SOEP	ARMP, ARPL, CELE, GUSU, MIND, MIPO,
Jonesville Pwr. & Lgt.	LA					LOPL	LOPL
Minden, City of	LA	MIND	39	30		LOPL	LOPL
Rayville Lgt. Plt.	LA	RAVI	39	NA		LOPL	LOPL
Ruston Wtr. & Lgt.	LA	RUST	83	38		LOPL	LOPL
Vidalia Mun. Elec.	LA					LOPL	LOPL
Winnfield, City of	LA					LOPL	LOPL
New Orleans Sew. & Wtr. Bd.	LA	NEOS	62	38		LOPL, NEOP	LOPL, NEOP
Lubbock, City of	TX	LUBB	254	135			(None)

Name of Utility	State	Code	Installed Capacity 1978 MW	Peakload 1978 MW	Major Interconnections	Radial Interconnections	Purchases Power From
McPherson Bd. of Pub. Util.	KS	MCPH	189	60	KAPL		KAPL
Galva, Town of	KS					MCPH	MCPH
Moundridge Wtr. & Lgt.	KS					MCPH	MCPH
Mississippi Pwr. & Lgt. Co.	MS	MIPO	2,789	1,899	ARPL, GUSU, LOPL, MIPR, SOMI, TVA NEOP, TVA		ARMP, ARPL, CLWL, GRUT, LOPL, MIPR,
Canton Mun. Util.	MS					MIPO	MIPO
Clarksdale Wtr. & Lgt.	MS	CLWL	63	34		MIPO	MIPO
Durant Lgt. & Wtr.	MS					MIPO	MIPO
Greenwood Util. Comm.	MS	GRUT	67	50		MIPO	MIPO
Itta Bena, City of	MS					MIPO	MIPO
Kosciusko Wtr. & Lgt.	MS					MIPO	MIPO
Lealand Wtr. & Lgt.	MS					MIPO	MIPO
Yazoo City Pub. Serv. Comm.	MS	YACY	29	25		MIPO	MIPO
Coahoma Elec. Pwr. Assn.	MS					MIPO	MIPO
Delta Elec. Pwr. Assn.	MS					MIPO	MIPO, GRUT
Magnolia Elec. Pwr. Assn.	MS					MIPO	MIPO
Southern Pine Elec. Pwr. Assn.	MS					MIPO	MIPO
Southwest Miss. Elec. Pwr. Assn.	MS					MIPO	MIPO
Twin County Elec. Pwr. Assn.	MS					MIPO	MIPO
Yazoo Valley Elec. Pwr. Assn.	MS					MIPO	MIPO
Missouri Pub. Serv. Co.	MO	MIPU	891	621	CEEP, INDN, KACP, NOEP, SPA, UNEC		ASEC, EMDE, INDN, KACP, KAGE, KAPL, NOMP, SPA
Galt, City of	MO					MIPU	MIPU
Gilman City, City of	MO					MIPU	MIPU
El Dorado Springs City of	MO					MIPU	MIPU
Harrisonville, City of	MO	HARR	16	12		MIPU	MIPU
Liberal Mun. Lgt. & Wtr.	MO					MIPU	MIPU
Odessa, City of	MO	ODES	5	6		MIPU	MIPU
Pleasant Hill Mun. Util.	MO					MIPU	MIPU
Rich Hill, City of	MO					MIPU	MIPU
Missouri Utilities Co.	MO	MIUC		3	ARMP, UNEC		ARMP, UNEC
Newkirk, City of	OK	NEWK	6	5			(None)
New Mexico Elec. Serv.	NM	NEME	194	104	SOPS		SOPS
New Orleans Pub. Serv.	LA	NEOP	1,296	967	LOPS		ARMP, ARPL, LOPL, MIPO
Norton, City of	KS	NORT	11	8			(None)
Oberlin, City of	KS	OBER	7	NA			(None)
Oklahoma Gas & Elec. Co.	AR,OK	OKGE	4,859	3,740	KAGE, PSOK, SOEP, SPA, WEFA		ARPL, KAGE WEFA
Blackwell, City of	OK					OKGE	OKGE
Braman, City of	OK					City of Blackwell	City of Blackwell
Clarksville Lgt. & Wtr.	OK					OKGE	SPA
Geary Mun. Lgt. & Wtr.	OK					OKGE	OKGE
Goltry, Town of	OK					OKGE	SPA
Kingfisher, City of	OK	KING	11	NA		OKGE	OKGE
Lexington, Town of	OK					OKGE	SPA
Manchester, Town of	OK					OKGE	OKGE

Name of Utility	State	Code	Installed Capacity 1978 MW	Peakload 1978 MW	Major Interconnections	Radial Interconnections	Purchases Power From
Oklahoma Gas & Elec. Co. (Continued)							
Mannford, City of	OK					OKGE	OKGE
Okeene, City of	OK					OKGE	OKGE
Orlando, Town of	OK					OKGE	OKGE
Paris Mun. Lgt. & Wtr.	AR					OKGE	SPA
Perry Wtr. & Lgt.	OK					OKGE	OKGE
Ponca City Mun.	OK	PONC	92	70		OKGE	OKGE
Pondcreek Wtr. & Lgt.	OK					OKGE	OKGE
Prague, Town of	OK					OKGE	OKGE
Purcell, City of	OK					OKGE	SPA
Spiro, Town of	OK					OKGE	SPA
Stillwater, City of	OK	STILL	23	63		OKGE	OKGE
Stroud Wtr. & Lgt.	OK					OKGE	OKGE
Tecumseh, City of	OK					OKGE	OKGE
Tonkawa Lgt. & Wtr.	OK	TONK	7	8		OKGE	OKGE
Watonga Wtr. & Lgt.	OK					OKGE	OKGE
Waynoka, City of	OK					OKGE	OKGE
Wynnewood Mun. Lgt. & Wtr.	OK					OKGE	OKGE
Yale, City of	OK					OKGE	SPA
Alfalfa Elec. Coop.	OK					OKGE, WEFA	OKGE, WEFA
Burlington, City of	OK					Alfalfa Coop.	Alfalfa Coop.
Carmen Mun. Lgt. & Wtr.	OK					Alfalfa Coop.	Alfalfa Coop.
Cherokee, City of	OK	CHER	7	5		Alfalfa Coop., WEFA	Alfalfa Coop., WEFA
Amorita, City of	OK					CHER	CHER
Byron, Town of	OK					CHER	CHER
Kiowa, City of	KS					Alfalfa Coop.	Alfalfa Coop.
Canadian Valley Elec. Coop.	OK					OKGE, PSOK	WEFA
Cimarron Elec. Coop.	OK					OKGE,WEFA	WEFA
Kay Elec. Coop.	OK					OKGE, PSOK	WEFA
Peoples Elec. Coop.	OK					OKGE, PSOK, WEFA	WEFA
Southeastern Elec. Coop.	OK					OKGE, PSOK, WEFA	WEFA
Red River Valley Coop.	OK					OKGE	OKGE, WEFA
Protection Mun. Wtr. & Lgt.	KS	PROT	3	NA			(None)
Public Serv. Co. of Oklahoma	OK	PSOK	3,022	2,527	GRRD, KAGE, KAMO, OKGE, SOEP, SOPS, SPA, WEFA		GRRD, KAGE, OKGE, SOEP, SOPS, SPA, WETU, UNEC
Altus, City of	OK					PSOK	PSOK
Anadarko Pub. Wks. Auth.	OK					PSOK	PSOK
Comanche, City of	OK					PSOK	SPA
Copan Lgt. & Wtr.	OK					PSOK	SPA
Cordell, City of	OK					PSOK	PSOK
Duncan Elec. Dept.	OK					PSOK	SPA
Eldorado Lgt. & Wtr.	OK					PSOK	SPA
Frederick, City of	OK					PSOK	PSOK
Granite Mun. Dist.	OK					PSOK	SPA
Hominy Mun. Elec.	OK					PSOK	SPA
Kaw City Mun. Elec.	OK					PSOK	PSOK
Manitou Lgt. Dept.	OK					PSOK	PSOK
Marlow Lgt. & Wtr.	OK					PSOK	PSOK, SPA
Olustee, Town of	OK					PSOK	SPA

Name of Utility	State	Code	Installed Capacity 1978 MW	Peakload 1978 MW	Major Interconnections	Radial Interconnections	Purchases Power From
Public Serv. Co. of Okla. (Continued)							
Pawhuska Lgt. & Wtr.	OK	PAWH	10	7		PSOK	PSOK
Ryan, Town of	OK					PSOK	SPA
So. Coffeyville Mun. Elec.	OK					PSOK	COFF
Walters Mun. Lgt. & Wtr.	OK					PSOK	SPA
Wetumka Mun. Elec.	OK					PSOK	SPA
Choctow Elec. Coop.						PSOK	SPA, WEFA
Sabine River Auth.	TX, LA	SARA	81	81		GUSU	GUSU
St. Francis Mun. Wtr. & Lgt.	KS	SAFR	6	3			(None)
St. Joseph Lgt. & Pwr.	MO	SAFL	278	254	IOPL, KACP, NOEP, OMPP		ASEC, INPD, IOPL, IOPS, KACP, NOSM, OMPP, UNEC
Sharon Springs, City of	KS	SHPS	3	2			(None)
Sho-Me Pwr. Coop.	MO	SHMPT	3	360	ASEC, CEEP, SPA		ASEC, UNEC
Ava, City of	MO					SHMP	SHMP
Cabool Mun. Sys.	MO					SHMP	SHMP
Cuba, City of	MO					SHMP	SHMP
Houston, City of	MO					SHMP	SHMP
Lebanon, City of	MO					SHMP	SHMP
Mansfield, City of	MO					SHMP	SHMP
Mountain View, City of	MO					SHMP	SHMP
Newburg Utils.	MO					SHMP	SHMP
Richland Mun. Util.	MO					SHMP	SHMP
St. Robert, City of	MO					SHMP	SHMP
Salem Lgt. & Pwr.	MO					SHMP	SHMP
Seymour, City of	MO					SHMP	SHMP
Steelville, City of	MO					SHMP	SHMP
Sullivan Mun. Util	MO					SHMP	SHMP
Waynesville, City of	MO					SHMP	SHMP
West Plains Wtr. & Lgt.	MO					SHMP	SHMP
Willow Springs, City of	MO					SHMP	SHMP
Winona, City of	MO					SHMP	SHMP
Crawford Elec. Coop.	MO					SHMP	SHMP
Gascosage Elec. Coop.	MO					SHMP	SHMP
Howell-Oregon Elec. Coop.	MO					SHMP	SHMP
Intercounty Elec. Coop.	MO					SHMP	SHMP
Laclede Elec. Coop.	MO					SHMP	SHMP
Se-Ma-No. Elec. Coop.	MO					SHMP	SHMP
Webster Elec. Coop.	MO					SHMP	SHMP
Southwestern Elec. Pwr.	AR,LA,OK	SOEP	2,757	2,381	AREC, ARPL, CELE, GRRD, LOPL, OKGE, PSOK, SPA		AREC, ARPL, CELE, PSOK, Bentonville, Ark., Tex-La Coop
Bentonville, City of	AR					SOEP	SPA
Siloam Springs Lgt.	AR					SOEP	SOEP
Bowie-Cass Elec. Coop.	TX					SOEP	Tex-La Coop
Deep East Texas Elec. Coop.	TX					SOEP, TEPL	SPA, Tex-La Coop
Panola-Harrison Elec. Coop.	TX					SOEP	Tex-La Elec Coop
Rusk County Elec. Coop.	TX					SOEP, TEPL	Tex-La Elec Coop
Upshur Rural Elec. Coop.	TX					SOEP	Tex-La Elec Coop
Wood County Elec. Coop.	TX					SOEP	Tex-La Elec Coop

Name of Utility	State	Code	Installed Capacity 1978 MW	Peakload 1978 MW	Major Interconnections	Radial Interconnections	Purchases Power From
Southwestern Pub. Serv. Co.	NM,OK,TX	SOPS	2,803	2,291	CETU, LEGE, NEME PSOK, WETU		NEME, PSOK
Brownfield Mun. Pwr. & Lgt.	TX	BROF	23	14		SOPS	SOPS
Canadian Lgt. & Pwr.	TX					North Plains Coop.	SOPS
Floydada, City of	TX	FLOY	7	4		SOPS	SOPS
Tucumcari Lgt. & Pwr.	NM	TUCU	20	10		SOPS	SOPS
Cochran Pwr. & Lgt. Co.	NM,TX					SOPS	SOPS
Community Pub. Serv. Co.	TX					SOPS	SOPS (Panhandle Div)
Bailey County Elec. Coop.	TX					SOPS	SOPS
Central Valley Elec. Coop.	NM					SOPS	SOPS
Deaf Smith Elec. Coop.	TX					SOPS	SOPS
Farmers Elec. Coop.	NM					SOPS	SOPS
Greenbelt Elec. Coop.	TX					SOPS, WETU	SOPS, WETU
Lamb County Elec. Coop.	TX					SOPS	SOPS
Lea County Elec. Coop.	NM,TX	LECE	80	62	SOPS		SOPS
Plains, City of	TX					LECE	LECE
Lighthouse Elec. Coop.	TX					SOPS	SOPS
Lyntegar Elec. Coop.	TX					SOPS, TEES	SOPS, TEES
North Plains Elec. Coop.	TX					SOPS	SOPS
Northfork Elec. Coop.	OK					SOPS, WEFA	SOPS, WEFA
Rita Blanca Elec. Coop.	TX					SOPS, Southwestern Coop	SOEP
Southwestern Elec. Coop.	NM					Rita Blanca Coop	Rita Blanca Coop
Roosevelt County Elec. Coop.	NM					SOPS	SOPS
South Plains Elec. Coop.	TX					SOPS	SOPS
Swisher Elec. Coop.	TX					SOPS	SOPS
Tri-County Elec. Coop.	OK					SOPS	SOPS
Springfield Utils.	MO	SPRM	463	338		SPA	SPA
Stockton Mun. Lgt. Plt.	KS	STOK	6	4		4	(None)
Sunflower Elec. Coop.	KS	SUNC	225	200	CEKE, CETU, PICA		CETU
Lane-Scott Elec. Coop.	KS					SUNC	SUNC
Dighton, City of	KS					Lane-Scott Elec Coop	Lane-Scott Coop
Pioneer Elec. Coop.	KS	PICA			SUNC		SUNC
Johnson City Elec.	KS					PICA	PICA
Wheatland Elec. Coop.	KS	WHEI				SUNC	SUNC
Garden City, City of	KS					WHEI	WHEI
Lakin, City of	KS					WHEI	WHEI
Southwestern Pwr. Adm.	AR,LA,MO, OK,TX	SPA	1,875	1,713	ARPL, ASEC, CEEP, EMDE, GUSU, KACP, KAMO, MIPU, NCEP, NOEP, OKGE, PSOK, SHMP, SOEP, WEFA		ASEC, ARPL, EMDE, OKGE, PSOK, SOEP
Carthage Wtr. & Elec.	MO	CART	37	29		SPA	SPA
Kennett Bd. of Pub. Wks.	MO	KENN	32	24		SPA	MIUC, SPA
Lamar Lgt. & Wtr.	MO					SPA	SPA
New Madrid Lgt. & Pwr.	MO	NEMA	5	6		ASEC, MAEP	SPA
Nixa Bd. of Pub. Wks.	MO					SPA	SPA
Piggott, City of	AR	PIGG	8	NA		SPA	SPA
Popular Bluff Bd. of Pub. Wks.	MO	POPL	14	40		SPA	SPA
Tex-La Elec. Coop.	TX	(contracts for energy as sale for resale--no facilities)					SOEP, SPA, TEPL
Tulia Lgt. & Pwr.	TX	TULI	15	8			(None)

Name of Utility	State	Code	Installed Capacity 1978 MW	Peakload 1978 MW	Major Interconnections	Radial Interconnections	Purchases Power From
West Texas Util. Co.[5]	TX	WETU	44	33	SOPS, WEFA		PSOK, SOPS
Gate City Elec. Coop.	TX					WETU	WETU
Hall County Elec. Coop.	TX					WETU	WETU
Western Farmers Elec. Coop.	OK	WEFA	738	558	OKGE, PSOK, SPA, WETU		OKGE, PSOK, SPA
Electra Lgt. & Pwr.	TX	ELEC	5	6		WEFA	WEFA
Fairview Lgt. & Wtr.	OK					WEFA	WEFA
Laverne Mun. Elec. Lgt.	OK					WEFA	WEFA
Lindsay Pub. Wks. Auth.	OK	LIND	10	7		WEFA	WEFA
Mangum, City of	OK	MANG	8	7		WEFA	WEFA
Vernon, City of	TX	VERN	13	11		WEFA	WEFA
Caddo Elec. Coop.	OK					WEFA	WEFA
Cotton Elec. Coop.	OK					WEFA	WEFA
Harmon Elec. Assn.	OK					WEFA	WEFA
Kiwash Elec. Coop.	OK					WEFA	WEFA
Northwestern Elec. Coop.	OK					WEFA	WEFA
Fort Supply, City of	OK					Northwestern Coop.	Northwestern Coop.
Mooreland Mun. Lgt. & Pwr.	OK					Northwestern Coop.	Northwestern Coop.
Oklahoma Elec. Coop.	OK					WEFA	WEFA
Rural Elec. Coop.	OK					WEFA	WEFA
Southwest Rural Elec. Assn.	OK					WEFA	WEFA
Wilson Wtr. & Lgt.	KS	WILS	5	NA			(None)
Electric Reliability Council of Texas			41,764	28,953[1]			
Austin Elec. Dept.	TX	AUST	1,541	763	LOCR		LOCR
Brazos Elec. Pwr. Coop.	TX	BREP	503	449	BRYN, DAPL, DENT, TEES, TEPL		Brazos River Auth. DENT, GARL, GUSU, LOCR, SOEP, SPA, TEES, TEPL, WETU
Bartlett Mun. Lgt.	TX					BREP	BREP
Granbury Mun. Util.	TX					BREP	BREP
Hearne Mun. Plt.	TX	HEAR	8	NA		BREP	BREP
Sanger Pwr. & Lgt.	TX					BREP	BREP
Seymour, City of	TX					BREP	BREP
Weatherford, City of	TX					BREP	BREP
Whitesboro, City of	TX					BREP	BREP
Texas A&M University	TX	TEAM	36	32		BREP	BREP
Brazos River Auth.	TX		23	(in BREP)		BREP	(None)
B-K Elec. Coop.	TX					BREP, TEES, WETU	BREP
Bartlett Elec. Coop.	TX					BREP, TEPL	BREP
Belfalls Elec. Coop.	TX					BREP, SOEP, TEPL	BREP
Comanche County Elec. Coop.	TX					BREP, TEES, TEPL, WETU	BREP
Cooke County Elec. Coop.	TX					BREP	BREP
Denton County Elec. Coop.	TX					BREP, TEPL	BREP
Erath County Elec. Coop.	TX					BREP, TEES, TEPL	BREP
Fort Belknap Elec. Coop.	TX					BREP, TEES, WETU	BREP
Hamilton County Elec. Coop.	TX					BREP, LOCR	BREP
Hill County Elec. Coop.	TX					BREP, TEPL	BREP

Name of Utility	State	Code	Installed Capacity 1978 MW	Peakload 1978 MW	Major Interconnections	Radial Interconnections	Purchases Power From
Brazos Elec. Pwr. Coop. (Continued)							
J-A-C Elec. Coop.	TX					BREP, TEES	BREP
Johnson County Elec. Coop.	TX					BREP, TEPL	BREP
Limestone County Elec. Coop.	TX					BREP, SOEP, TEPL	BREP
McLennan County Elec. Coop.	TX					BREP, TEPL	BREP
Mid-South Elec. Coop.	TX					BREP, GUSU	BREP
Navarro County Elec. Coop.	TX					BREP, SOEP, TEPL	BREP
Robertson Elec. Coop.	TX					BREP, TEPL	BREP
Tri-County Elec. Coop.	TX					BREP, TEPL	BREP
Wise Elec. Coop.	TX					BREP, TEPL	BREP
Brownsville Pub. Utils. Bd.	TX	BROV	111	109		CEPL	CEPL
Bryan, City of	TX	BRYN	255	135		BREP	BREP, DENT, GARL, GRUD
Bryan, City of, REA Div.	TX					BRYN	BRYN
College Station, City of	TX					BRYN, GUSU	BRYN, GUSU
Central Pwr. & Lgt. Co.	TX	CEPL	3,303	2,341	HOLP, INBW, LOCR, MECI, SAAN, SOTE, WETU		INBW, SAAN, WETU, GUBR
Gonzales Elec. Dist. Syst.	TX					CEPL	LOCR
Robstown, City of	TX	ROBS	24	NA		CEPL	CEPL
Comm. Fed. de Elec.	MEX					CEPL	CEPL
Guadalupe-Blanco Riv. Auth.	TX	GUBR	16	(in CEPL)		CEPL	(None)
U.S. Dep. Energy WAPA	TX	INBW6	32	(in CEPL)		CEPL	(None)
DeWitt County Elec. Coop.	TX					CEPL, LOCR	LOCR
Kimble Elec. Coop.	TX					CEPL, WETU	CEPL, LOCR
Magic Valley Elec. Coop.	TX					CEPL	CEPL
Medina Elec. Coop.	TX	MECI	75	48	CEPL, SOTE		CEPL, SAAN, SOTE
Nueces Elec. Coop.	TX					CEPL, SOTE	CEPL, SOTE
Rio Grande Elec. Coop.	TX					CEPL, ELPE, MECI WETU	CEPL, ELPE, MECI WETU
South Texas Elec. Coop.	TX	SOTE	48	132	CEPL, MECI, SAAN		CEPL, MECI, SAAN
Jackson Elec. Coop.	TX					SOTE	SOTE
Karnes Elec. Coop.	TX					SOTE	SOTE
San Patricio Elec. Coop.	TX					SOTE	SOTE
Victoria Co. Elec. Coop.	TX					CEPL, SOTE	CEPL, SOTE
Wharton Co. Elec. Coop.	TX					SOTE	SOTE
Dallas Pwr. & Lgt. Co.	TX	DAPL	4,039	2,609	TEES, TEPL		TEES, TEPL
Denton Mun. Util.	TX	DENT	188	114		BREP	BREP, BRYN, GARL, GRUD
Garland, City of	TX	GARL	442	285		TEPL	BREP, BRYN, DENT GRUD
Greenville Elec. Dept.	TX	GRUD	101	59		GARL	BREP, BRYN, DENT, GARL
Houston Lgt. & Pwr. Co.	TX	HOLP	12,334	9,362	CEPL, COPS, LOCR, TEPL		SAAN, TEPL
Community Pub. Serv.	TX	COPS				HOLP, TEES, TEPL, WETU	HOLP, TEES, TEPL, WETU
Farmersville, City of	TX					COPS	COPS

Name of Utility	State	Code	Installed Capacity 1978 MW	Peakload 1978 MW	Major Interconnections	Radial Interconnections	Purchases Power From
Lower Colo. River Auth.	TX	LOCR	1,311	863	AUST, CEPL, HOLP, SAAN, TEPL		AUST, CEPL, SAAN, WETU
Bastrop, City of	TX					LOCR	LOCR
Bellville Lgt. & Pwr.	TX					LOCR	LOCR
Boerne Utils.	TX					LOCR	LOCR
Brenham Mun. Util.	TX					LOCR	LOCR
Burnet, City of	TX					LOCR	LOCR
Cuero Elec. Dept.	TX					CEPL	LOCR
Fredericksburg Elec. Util.	TX					LOCR	LOCR
Georgetown, City of	TX					LOCR	LOCR
Giddings, City of	TX					LOCR	LOCR
Goldthwaite, City of	TX					LOCR	LOCR
Hallettsville Mun. Util.	TX					LOCR	LOCR
Hempstead, City of	TX					LOCR	LOCR
La Grange Utils.	TX					LOCR	LOCR
Lampasas Pub. Util.	TX					LOCR	LOCR
Lexington Mun.	TX					LOCR	LOCR
Llano Utils.	TX					LOCR	LOCR
Lockhart Utils.	TX					LOCR	LOCR
Luling Utils.	TX					LOCR	LOCR
Mason, City of	TX					WETU	LOCR, WETU
Moulton, City of	TX					LOCR	LOCR
New Braunfels Utils.	TX					LOCR	LOCR
Schulenburg, City of	TX					LOCR	LOCR
Seguin, City of	TX					LOCR	LOCR
Shiner Lgt. & Wtr.	TX					LOCR	LOCR
Smithville Lgt. & Wtr.	TX					LOCR	LOCR
Welder Elec. Dist. Sys.	TX					LOCR	LOCR
Weimar, City of	TX					LOCR	LOCR
Yoakum Mun. Util.	TX					LOCR	LOCR
Bandera Elec. Coop.	TX					LOCR	LOCR
Bluebonnet Elec. Coop.	TX					LOCR	LOCR
Central Tex. Elec. Coop.	TX					LOCR	LOCR
Fayette County Elec. Coop.	TX					LOCR	LOCR
Guadalupe Valley Elec. Coop.	TX					LOCR	LOCR
McCulloch County Elec. Coop.	TX					LOCR, TEPL, WETU	LOCR, TEPL, WETU
Pedernales Elec. Coop.	TX					LOCR	LOCR
San Bernard Elec. Coop.	TX					LOCR	LOCR
San Antonio Public Serv. Bd.	TX	SAAN	3,034	1,688	CEPL, LOCR		(None)
Castroville, City of	TX					SAAN	SAAN
Floresville Elec. Lgt. & Pwr.	TX					SAAN	SAAN
Hondo Elec. Sys.	TX					SAAN	SAAN
Texas Elec. Serv. Co.	TX	TEES	5,877	3,802	BREP, COPS, DAPL, TEPL, WETU		DAPL, TEPL
Bowie, City of	TX					TEES	TEES
Goldsmith, City of	TX					TEES	TEES
Cap Rock Elec. Coop.	TX					TEES	TEES
Lone Wolf Elec. Coop.	TX					TEES	TEES
Lyntegar Elec. Coop.	TX					SOPS, TEES	SOPS, TEES

Name of Utility	State	Code	Installed Capacity 1978 MW	Peakload 1978 MW	Major Interconnections	Radial Interconnections	Purchases Power From
Texas Elec. Serv. Co. (Continued)							
Midwest Elec. Coop.	TX					TEES, WETU	TEES, WETU
Taylor Elec. Coop.	TX					TEES, WETU	TEES, WETU
Texas Pwr. & Lgt. Co.	TX	TEPL	7,308	5,242	BREP, DAPL, HOLP, LOCR, TEES		BREP, COMM, DAPL, SPA, TEES
Bridgeport Lgt. & Pwr.	TX					TEPL	TEPL
Commerce, City of	TX	COMM	9	NA		TEPL	TEPL
Southwestern Elec. Serv. Co.	TX					TEPL	TEPL
Cherokee County Elec. Coop.	TX					TEPL, SW Elec. Serv.Co.	TEPL, Tex-La Coop.
Deep East Texas Elec. Coop.	TX					SOEP, TEPL	SPA, Tex-La Coop.
Garrison, City of	TX					Deep East Tex. Coop.	Deep East Tex. Coop.
Hemphill, City of	TX					Deep East Tex. Coop.	Deep East Tex. Coop.
San Augustine Lgt. & Wtr.	TX					Deep East Tex. Coop.	Deep East Tex. Coop.
Timpson, City of	TX					Deep East Tex. Coop.	Deep East Tex. Coop.
Fannin County Elec. Coop.	TX					TEPL	TEPL, SPA, Tex-La Coop.
Farmers Elec. Coop.	TX					TEPL	TEPL, SPA, Tex-La Coop.
Grayson-Collin Elec. Coop.	TX					TEPL	TEPL, SPA, Tex-La Coop.
Houston County Elec. Coop.	TX					GUSU, TEPL	GUSU, TEPL, SPA, Tex-La Coop.
Hunt-Collin Elec. Coop.	TX					TEPL	TEPL, SPA, Tex-La Coop.
Jasper-Newton Elec. Coop.	TX					GUSU, TEPL	Sam Rayburn Dam Coop., SPA, Tex-La Coop.
Kaufman County Elec. Coop.	TX					TEPL	TEPL, SPA, Tex-La Coop.
Lamar County Elec. Coop.	TX					TEPL	TEPL, Tex-La Coop.
New Era Elec. Coop.	TX					TEPL	TEPL, Tex-La Coop.
Rusk County Elec. Coop.	TX					SOEP, TEPL	SOEP, TEPL, SPA, Tex-La Coop.
Sam Houston Elec. Coop.	TX					GUSU, TEPL	Sam Rayburn Dam Coop., SPA
Wood County Elec. Coop.	TX					SOEP, TEPL	Tex-La Coop.
Southwestern Pwr. Admn.	TX						
Denison Dam	TX	SPA	35	35		TEPL	(None)
Whitney Dam	TX	SPA	30	20		BREP	(None)
West Texas Utils. Co.[7]	TX	WETU	1,045	806	CEPL, TEES, TEPL		BRAD, BREP, CEPL, LOCR
Baird, City of	TX	BAIR	2	5		WETU	WETU
Brad, City of	TX	BRAD	22	11		WETU	(None)
Coleman, City of	TX	COLE	12	9		WETU	WETU
Sonora Municipal	TX					WETU	WETU
Comm. Fed. de Elec.	MEX					WETU	WETU
Coleman County Elec. Coop.	TX					WETU	WETU
Concho Valley Elec. Coop.	TX					WETU	WETU

Name of Utility	State	Code	Installed Capacity 1978 MW	Peakload 1978 MW	Major Interconnections	Radial Interconnections	Purchases Power From
West Texas Utils. Co. (Continued)							
Dickens County Elec. Coop.	TX					WETU	WETU
Southwest Texas Elec. Coop.	TX					WETU	WETU
Stamford Elec. Coop.	TX					WETU	WETU

---

[1] Noncoincidental peakload.
[2] Estimated portion of SWPP--ASEC is also a member of MAIN.
[3] Member of SWPP and MAIN--only small load in SWPP served by ARMP.
[4] Completion of tie with CETU expected in near future.
[5] Interstate system--member of SWPP and ERCOT.
[6] Falcon Dam.
[7] Intrastate System--Member of SWPP and ERCOT.

APPENDIX C
COMMENTS FROM SELECTED ORGANIZATIONS

The following organizations provided comments on an external review draft of the report in response to a request by the director, Office of Electric Power Regulation, Federal Energy Regulatory Commission.

- American Public Power Association
- Edison Electric Institute
- Electric Utility Systems, Economic Regulatory Administration, Department of Energy
- Office of Power Marketing Coordination, Resource Applications, Department of Energy
- National Rural Electric Cooperative Association

The comments received from the above organizations are included in this Appendix. The following organizations were also invited to comment but did not respond directly. However, a number of these entities were represented on the task force and, thus, their views are already reflected in the report and the comments thereon.

- Public utility commissions of Arkansas, Kansas, Louisiana, Mississippi, Missouri, New Mexico, Oklahoma, and Texas
- Electric Reliability Council of Texas
- Southwest Power Pool
- National Association of Regulatory Commissioners--Committee on Electricity

SEP 4 1980

Department of Energy
Washington, D.C. 20461

Dr. William W. Lindsay
Director, Office of Electric
Power Regulation
Federal Energy Regulatory Commission
Washington, D. C. 20426

Dear Dr. Lindsay:

The draft report on Power Pooling in the South Central Region has been reviewed by the Office of Utility Systems. The report is an exceptionally well written and useful account of the status and prospects of power pooling in the region. Discussion of controversial issues was especially well done in that such discussion was balanced, objective and candid.

Our review indicated some ways in which the report can be improved, clarified or strengthened:

- "Definition of the South Central Region", with virtually identical text, appears on page 6 and 11. The latter page appears to be an earlier draft which was unintentionally retained in the final draft report.

- Twenty one isolated municipal systems existed in the region as of yearend 1978 (p. 12). Reasons given for this isolation include (p.80 & 85) size of load, distance from potential interconnecting systems and prohibitive and inhibitive regulatory factors. It would be helpful to specifically identify the regulatory factors involved and to assess the prospects for future interconnection of these systems.

- The control area configuration shown on Figure 4 (p. 22) is somewhat out of date and can be updated with information in the ERCOT and SPP 411 reports of April 1980.

- The Texas Municipal Power Agency (TMPA) expects to commence central dispatch in 1981. It may be desirable to reflect this information in the report and possibly to move the TMPA (p. 27) from the informal pool to the formal pool classification.

- In discussing bilateral arrangements, it is stated (p. 30) that economy energy exchanges require a contract path and that this requirement nearly precludes such exchanges between non-contiguous systems. We find this statement difficult to interpret and therefore needing clarification.

  - We would agree if the statement means that absence of a contract path between non-contiguous utilities precludes economy exchanges.

  - We would disagree if the statement means that, in the presence of a bilateral (as opposed to multilateral) contract path, such exchanges between non-contiguous systems need be nearly precluded. The Florida Coordinating Group operates a successful brokerage system between non-contiguous utilities in a setting of bilateral arrangements.

- The report states (p. 31) that economy exchanges are impeded if State Regulators require full passthrough to ratepayers of all savings from such transactions. Clearly utility retention of some part of the savings would provide greater incentive. However we doubt if State Regulators would look favorably upon a utility foregoing economy exchanges simply because full savings are passed through to ratepayers. Some utilities argue for full passthrough as a way of stabilizing reported earnings and assuring their ratepayers of good faith efforts to moderate electricity bills.

- The report observes (p. 31) that, because of time lag in recovering fuel adjustments, a company may experience financial losses as the result of engaging in economy exchanges. Further explanation of why this is so would be helpful.

- The following statement appears on p. 83, 1st paragraph: "Pricing methods must ensure that "middle men" in multiutility transfers do not receive profits inappropriate to their costs and thus inhibit savings by companies that are ... (non-contiguous)". Clarification is desirable so it can be determined whether the reference is to a problem already addressed by FERC (e.g., RM 79-29 which limits charges for transmission service calculated by percentage adders) or to other problems.

- It is doubtful if reliability concerns can be adequately addressed if interchanges are directly negotiated between non-contiguous buyers and sellers, as advocated (p. 83, 1st para.) One approach to addressing both negotiating and reliability concerns could be an area-wide "posting" of buy/sell quotes with desired transactions confirmed after due consideration of reliability concerns of intervening utilities.

  The additional reference to negotiating transfers without a chain of two party contracts from seller to buyer requires clarification. There is no problem if a multilateral agreement is being endorsed; there is a considerable problem if an in-place contract path is being viewed as unnecessary.

- Care is advocated (p. 83, last para.) to ensure: (a) that excess profits are not built into fuel prices of energy transfers, and (b) receiving ratepayers are given an equitable share of the benefits. The referenced rate design problems(s) should be clearly explained. For example, are the potential problems:

  - excessive estimates of replacement fuel cost?
  - unlimited monetary add-ons resulting from percentage or split-savings adders?
  - absence of a mechanism to flow through to ratepayers a significant portion of savings realized on economy energy purchases?

- State commissions are urged to adopt (p. 84) "innovative ratemaking incentives that inherently recognize benefits achieved through pooling." A discussion of the type of initiatives being advocated is needed to understand this statement.

  For example such incentives might include:

  - utility retention of a portion of savings realized by interchange sales.
  - quicker reflection of costs of economy purchases in fuel adjustment clause calculations.

- Savings from economy exchanges are said (p. 87) to be considerable but not available on a total basis. Does this statement refer to data availability or to such savings not being available to all utilities?

- Contractual agreements prohibiting operation in interstate commerce are given (p. 90) as a legal impediment to increased coordination. Specific agreements with such prohibitions should be cited.

  The text should take note of an additional impediment: Interstate operation results in mandatory FERC jurisdiction whereas the utilities involved, as noted elsewhere in the report, have expressed concern over becoming subject to such jurisdiction. (A later comment discusses a proposed settlement agreement which would moderate this impediment.)

- It appears that the favorable reference to pending legislation (p. 91) to "enhance the environmental requirement process" might more accurately have been intended to refer to accelerating this process.

- The regional task force reports (p. 94, 1st para.) that most financial and operating advantages of coordination in the region are currently being realized and that opportunities for further coordination will be exploited as dictated by future economics or circumstances. It would be helpful if candidate opportunities for possible future adoption were identified (e.g., unit commitment, central dispatch, improved procedures for brokering economy and firm transactions, etc.)

- The discussion of transmission access for firm type transactions (p. 94, 2nd para.) is in the context of existing transmission facilities. Possibly closer coordination (and suitable financial arrangements) for facilitating firm type transactions when planning new or upgraded transmission is another regional opportunity for increased coordination.

- Discussion of the ERCOT/C&SW proceedings (pp. 96-97) could be improved by observing that the major utilities involved have presented an offer of settlement to FERC which would initiate coordination between the two areas. (Especially since p. 15 reports no present coordination between these parties). The Department of Energy has submitted a statement to FERC strongly supporting the Settlement Agreement.
- The reference to "jointly formed units" (p. 1) appears to be in error.

The Office of Utility Systems appreciates the opportunity to offer these comments.

Sincerely,

Jerry L. Pfeffer
Assistant Administrator
for Utility Systems
Economic Regulatory Administration

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1980 AUG 18 PM 2:29
OFFICE OF
ELECTRIC POWER REGULATION

AMERICAN PUBLIC POWER ASSOCIATION
2600 VIRGINIA AVENUE NW WASHINGTON DC 20037 · 202/342-7200

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Chelan County Public Utility District
Wenatchee, Washington
ROBERT C. YOUNG
Burlington, Vermont

August 11, 1980

RECEIVED
AUG 19 1980
DIV. OF ISA

Mr. William W. Lindsay
Director, Office of
Electric Power Regulation
Federal Energy Regulatory
Commission
825 N. Capitol St., N.E.
Washington, D.C. 20426

Dear Mr. Lindsay:

Thank you for providing a review draft of the report on power pooling in the South Central Region by the regional task force. This report adds a great deal to an understanding of how complex and variable are the many types of inter-system energy transfers described under the loose title of "pooling."

The material in chapters 7-9 are extremely interesting. Chapter 8 describes in considerable detail the potential benefits of increasing the coordination of the region. Figures 2 and 8 referred to on page 85 were not included in our copy.

Chapter 7 and 9 describe the problems associated with achieving increased coordination. The concerns of regulators in chapter 7 regarding power pooling points out a basic issue -- in the pricing of energy and capacity transfers there is no automatic assurance that all parties will share properly in the benefits. Yet, regulators have the responsibility to ensure that the consumers of individual utilities reap an equitable share of any benefits to be gained by pooling.

Chapter 9, which discusses impediments to increased regional coordination, tends to be a little too general in discussing these problems. The only exceptions are in the discussions of the effect of a definition of Title V of the Fuel Use Act on TMPA and the limitations on transmission because of the region's exposure to severe weather extremes. It is difficult to evaluate the relative importance of the other problems as they relate to the region.

As in the previous regional task force report on power pooling, this report will be useful appendix material for the forthcoming FERC report. We are looking forward to reviewing that report as soon as it is made available for review and comment.

Sincerely,

Herbert Blinder

Herbert Blinder
Director, Technical Services

HB:vm

cc: William Wheelock

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NRECA NATIONAL RURAL ELECTRIC COOPERATIVE ASSOCIATION
1800 Massachusetts Avenue, N.W.
Washington, D.C. 20036/202-857-9500

July 29, 1980

Mr. William W. Lindsay, Director
Office of Electric Power Regulation
Federal Energy Regulatory Commission
Washington, D.C. 20426

Dear Mr. Lindsay:

This will acknowledge receipt of your letter of July 15 and the enclosed report "Power Pooling in the South Central Region" which was prepared by the South Central Regional Task Force.

Inasmuch as NRECA had one or more representatives participating in the preparation of this report, we plan to withhold our comments until we are asked to review the combined report of all the regions which is to be prepared by the Commission.

We thank you for sending this material to us which we will use as backup material when we review the Commission's drafted report.

Sincerely,

Robert D. Partridge

Robert D. Partridge
Executive Vice President
and General Manager

RDP/ajl

RECEIVED
1980 AUG -6 AM 9:36
OFFICE OF
ELECTRIC POWER REGULATION

Department of Energy
Washington, D.C. 20461

AUG 4 1980

Mr. William W. Lindsay
Director
Office of Electric Power Regulation
Federal Energy Regulatory Commission
Washington, DC 20426

Dear Mr. Lindsay:

This is in reply to your letter of July 15, 1980, requesting our comments on the Commission's South Central Task Force report.

We have reviewed the report "Power Pooling in the South Central Region" and believe the report fairly represents the objectives and accomplishments of the power industry in the South Central region toward power pooling.

We appreciate the opportunity to comment on the report and if we can further assist you in your studies, please feel free to contact my office.

Sincerely,

Daniel M. Ogden Jr

Daniel M. Ogden, Jr.
Director, Office of Power
Marketing Coordination
Resource Applications

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ELECTRIC POWER REGULATION

JUSTIN KARP, Vice President

EDISON ELECTRIC INSTITUTE The association of electric companies

1111 19th Street, N.W.
Washington, D.C. 20036
Tel: (202) 828-7400

August 11, 1980

RECEIVED
AUG 14 1980
DIV. OF ISA

Mr. William W. Lindsay
Director, Office of Electric
Power Regulation
Federal Energy Regulatory Commission
Washington, DC 20426

Dear Mr. Lindsay:

The Edison Electric Institute appreciates the opportunity to comment on the draft report on Power Pooling in the South Central region.

In Jack Kearney's letter to you dated May 21, 1980, EEI commented on a similar draft report which addressed power pooling in the Southeast region. Whereas the Southeast region is highly integrated and interconnected both internally and externally with other regions, the South Central region notably lacks interconnections -- between ERCOT and adjoining states. Proceedings to examine the merits of interstate interconnections are mentioned in the report, but no detailed information is given to support or refute the desirability of additional interstate coordination. With the exception of this omission, we believe that the report generally provides an accurate and informative description of regional coordination and power pooling in the South Central region.

Utilities in the South Central region have achieved a commendably high level of service reliability and cost efficiency. This is a significant achievement considering the number of nonassociated entities and distances involved in the region. Increasing investment costs, increasing operating costs and load growth may create new opportunities for power brokerage, joint use of facilities, or centralized economic dispatch.

We would agree with the statement in the report to the effect that the existing pooling groups should "practice more intensive pooling when future growth and budgeting require and justify it." In other words, increased coordination arrangements should only be pursued if the benefits are justified in terms of offsetting associated increased problems and costs to utilities. In the final analysis, we believe that increased interutility coordination is desirable when it results in optimizing the cost and reliability of service from the viewpoint of consumers.

Your cover letter points out that the task force was not asked to provide explicit findings or recommendations. Since the task force began with this point of departure, the report's contents should not be considered to be complete, balanced or necessarily representative of an industry position. It should further be noted that most of the utilities in the region were not represented on the task force and have not had an opportunity to give input or comments.

If the Edison Electric Institute can be of further assistance, please contact Fred Denny, our Director of Engineering, who was involved in reviewing the report and preparing our comments.

Sincerely yours,

Justin Karp

amm

cc: John J. Kearney
Fred I. Denny

APPENDIX D
COMMENTS FROM INDIVIDUAL TASK FORCE MEMBERS

The external review comments on a draft of the report, which are included in Appendix C, were forwarded to each member of the South Central Task Force for review and comments as to disposition. Written comments were received from some of the task force members and these are included in this Appendix D. In addition, the chairman of the task force contacted each member by phone to solicit their views as to disposition of the external review submissions.

The consensus of the task force members, as substantiated by the written responses received from some members, was that the external review comments were appreciated but were not of such consequence as to justify revision of the report at this stage. However, obvious corrections called to attention as a result of the review should be made. In addition, some of the written comments included herewith respond to portions of the external review remarks.

HOUSTON LIGHTING & POWER COMPANY
HOUSTON, TEXAS 77001

D. E. SIMMONS
VICE PRESIDENT
ENGINEERING AND TRANSMISSION
AND DISTRIBUTION

September 26, 1980

Referred
On To ACK
Flood
Sanders (att)
Washington

Mr. Lenard B. Young
Regional Engineer
Federal Energy Regulatory Commission
819 Taylor Street
Fort Worth, Texas 76102

Dear Lenard,

Subject: FERC Power Pooling Study

I have reviewed the comments provided by external reviewers which were transmitted with Bill Wheelock's letter of September 8, 1980. There are some interesting comments made in these reviews. However, I do not feel that these comments are of enough consequence to justify revising the Power Pooling Report. There are several errors noted in these reviews and these errors should be corrected.

It was a privilege for me to serve on your Task Force to prepare this report.

Sincerely,

Gene

DES:lw
cc: Messrs. D. D. Jordan
R. L. Evans
K. R. Hinckley
K. L. Williams
C. F. Ham

FEDERAL ENERGY REGULATORY COMMISSION
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Public Utility Commission
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George M. Cowden
Chairman

H. M. Rollins
Commissioner

Garrett Morris
Commissioner

September 25, 1980

Noted by ... 9/29 Ack
Referred
On To ACK ATTN INFO FILE
Flood 10/2
Landers
Washington

The Honorable Lenard B. Young
Federal Energy Regulatory Commission
Regional Office
819 Taylor Street
Fort Worth, Texas 76102

Dear Mr. Young:

I am in receipt of the comments provided by external reviewers concerning the "Power Pooling in the South Central Region," and I have reviewed such comments.

Some of the comments have to do with corrections in the text, and to that extent, should be honored. With respect to the more general comments concerning the content, I find little in them that would add to the validity of the report. It is my understanding, that the report was made to reflect the existing conditions, and it seems to me, that it reflects that very adequately.

With respect to the isolated municipal systems, the main impediment, of course, is distance and cost. I know of no particular regulatory restraint affecting these matters. If there is any restraint, the proposed settlement agreement between the dominant members of ERCOT, now pending before the Federal Energy Regulatory Commission, if approved, would certainly remove such restraint.

With respect to the comments concerning economy power, the benefits from such power sales are currently passed along to the ratepayers of the selling utility as well as to the ratepayers of the consuming utility. The savings to the ratepayers of the consuming utility is affected through an automatic

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fuel adjustment clause, and the ratepayers of the selling utility, are benefited by the receipt of the income from such sale which is used to offset the cost of service of the seller.

I want to take this opportunity to commend you on your leadership of the committee and for the work which was accomplished. I think you have done an excellent job and I see no need to further expand the report accept for the corrective matters.

Sincerely yours,

Garrett Morris

GM/sp

WESTERN FARMERS **ELECTRIC COOPERATIVE**
Post Office Box 429
Anadarko, Oklahoma 73005
405-247-3351

September 25, 1980

Referred
To
Flood
Sanders (Hunt)
Washington

Mr. Lenard B. Young
Regional Engineer
Federal Energy Regulatory Commission
819 Taylor Street
Fort Worth, TX 76102

Dear Mr. Young:

I have reviewed the comments provided by the external reviewers of the Task Force report on Power Pooling in the South Central Region.

As a member of the Task Force, I do not plan to comment further on these reviews.

Sincerely,

J H Frampton

J. H. Frampton
Manager, System Operations

JHF:sm

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SOUTHWEST POWER POOL

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President
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September 25, 1980

Referred
On To

Mr. Lenard B. Young
Chairman
Task Force on Power Pooling
in South Central Region
Federal Energy Regulatory Commission
819 Taylor Street
Fort Worth, Texas 76104

Dear Mr. Young:

As a Task Force Member, I have reviewed the "External Reviewers" comments distributed by Mr. W. I. Wheelock on September 8th and offer the following comments:

1) DOE Comments by Mr. J. Pfeffer

While much time/effort went into Pfeffer's comments, for the most part they are editorial in nature (see page 1, Item 1). However, at least one involves FERC internal matters and I am not qualified to comment. (Page 2, last Item).

2) AMERICAN PUBLIC POWER ASSOCIATION

Mr. Blinder feels Chapter 9 was "...a little too general." I believe this report is intended for audiences that are qualified to interpret the statements without us resorting to great amounts of detail. As a member, I believe the charge to us conveyed this intent.

3) NRECA

No comments.

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-more-

4) DOE, Office of Power Marketing Coordination

Concur with Mr. Ogden

5) Edison Electric Institute

I certainly concur with Mr. Karp's comments especially paragraph 4, page 1. Mr. Karp's comments in paragraph 1, page 2 as to the cover letter (as to explicit findings and recommendations) are well taken. However, since the Task Force consisted of representatives from all segments of the industry, as well as the various Power Pools and regulators, we feel the findings do reflect the concensus so far as it is humanly possible to do so.

In conclusion, I believe that several of Mr. J. Pfeffer's suggestions regarding editorial changes might be accomodated - if they do not require complete re-writing of the report. However, I would be opposed to any re-writing of major sections at this late stage.

Sincerely,

B C Hulsey

B. C. Hulsey

BCH:mo

Central and South West Services, Inc.
2700 One Main Place • Dallas, Texas 75250 • 214-748-8481

JACK C. WELLS
Senior Vice President
Engineering

Referred
On To
ACK ATTN INFO FILE
Young
Landers (Clark)
Washington

October 2, 1980

Mr. Leonard Young
Federal Energy Regulatory Commission
819 Taylor Street, Room #9A05
Ft. Worth, Texas 76102

Dear Leonard,

Attached please find two attachments containing my comments in response to the information received from Mr. Wheelock and my telephone conversation with you last week concerning the draft report on Power Pooling in the South Central Region.

Attachment 1 are my comments on the comments attached to Mr. Wheelock's letter and Attachment 2 is my discussion on the report.

If you have any questions, please give me a call.

Sincerely,

Jack C. Wells
by James A. Bruggeman

JCW/vlb

Attachments

cc: W. P. Smith, Jr.

OCT 6 1980

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ELECTRICITY FOR THE SOUTHWEST

ATTACHMENT 1

COMMENTS ON COMMENTS ATTACHED TO MR. WHEELOCK'S LETTER

Pfeffer's Letter

First comment on p.4 - Need to define "total basis". The WTU savings (p.87 of report) are equal to CPL's savings since CPL and WTU use a 50-50 split savings methodology.

Third comment on p.4 - Maybe should read "enhance and accelerate".

First comment on p.5 - Attached is a recent article from "Electrical Week" which might be helpful if something was added to the report on the SPP/ERCOT interconnection proceedings.

ABSTRACT FROM ELECTRICAL WEEK

FERC STAFF JOINS TEXAS INTERTIE ACCORD; JUSTICE RAISES NO OBJECTION

The settlement in the Texas intertie case cleared a major hurdle as the staff of the Federal Energy Regulatory Commission threw its support behind the agreement in return for modifications in the wheeling terms designed to give greater protection to the small utilities in the area. Meanwhile, the antitrust division of the Justice Dept. and the staff of the Nuclear Regulatory Commission have reached agreement with major electric utilities in Texas on the license conditions for the Commanche Peak and South Texas nuclear power plants, quieting earlier fears that Justice might use the licensing proceeding to contest the settlement reached by the utilities on the interconnection issue (EWk, 16 June, 1).

The major concession won for the small utilities by the FERC staff is a provision reserving 15% of the capacity of the two proposed interconnections for their use during the first five years the interconnections are in operation. The staff also won FERC jurisdiction over all rates for wheeling power to, from and over the interconnections, even when the wheeling is performed by a utility not subject to FERC jurisdiction on any other matter.

The settlement process in the interconnection case is far from complete, however, as the smaller utilities in Texas and the surrounding area have not yet had their say on the amended agreement. At least one municipal utility and one cooperative have expressed opposition to earlier versions of the settlement.

The settlement, if it survives the entire regulatory gauntlet, will resolve a dispute which has been going on since the mid-1970s and end the isolation of the Texas electric system. Central & South West, a holding company with subsidiaries both inside and outside Texas, has been pushing for the interconnections ever since a group of municipal utilities in Oklahoma challenged its holding company status on grounds that it was not operating a coordinated system. The interconnection was opposed vigorously by Texas Utilities and Houston Lighting & Power, which feared that the interconnection would reduce the reliability of their systems and subject them to FERC jurisdiction. The settlement arrived at earlier this year provides for construction of two direct current interconnections, which would not have the same potential for reducing system reliability as synchronous, alternating current interconnections. The settlement also requires that the interconnection be approved under a provision of the Public Utility Regulatory Policies Act protecting the intrastate utilities in Texas from FERC jurisdiction. Among the terms added to the settlement by the new agreement between CSW, HL&P, TU and FERC staff:

- The owners of the interconnections will make 15% of their capacity available for five years to provide firm wheeling service to utilities with loads of less than 500 MW. The small utilities also will have the right to buy into this capacity, which amounts to 105 MW between the two interconnections (which are to have total capacity of 700 MW).
- Within three months after the settlement is approved by FERC, CSW must file wheeling rates for use by utilities with loads of less than 1,500 MW. Separate rates are to be filed for CSW's Texas subsidiaries and its subsidiaries outside Texas. A CSW source said this provision is not really related to the interconnection issue, but was included as a concession to the FERC staff.

A NEW JERSEY ALJ URGED COMPLETE REJECTION OF A GPU REQUEST FOR A $76-MILLION increase in the amounts collected under the energy adjustment clause of General Public Utilities' subsidiary, Jersey Central Power & Light, over the next year. In a report issued last week, administrative law judge Stephen Marshall told the New Jersey Board of Public Utilities (BPU) that there were too many uncertainties surrounding the energy cost increases projected by Jersey Central, and that the company had not proven its case for the rate increase. Jersey Central got an increase in its energy adjustment clause earlier this year. The BPU normally only adjusts the amounts collected under the clause annually and Jersey Central is the first of the state's major utilities to request a mid-year change in the clause, a BPU spokesman said. It was unclear last week when the board itself would act on the case.

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ATTACHMENT 2

COMMENTS ON THE REPORT

The report is exceptionally well written and represents many hours of dedicated work by the South Central Task Force members. The report is a comprehensive factual document that depicts the significant characteristics of present, as well as, potential power pooling in the region. I express my gratitude for being chosen as a member of the South Central Task Force; it has been a pleasure to participate with its highly qualified members.

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cpL

Vice President

Referred
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Flood

Washington

October 13, 1980

Mr. Leonard Young
Federal Energy Regulatory Commission
819 Taylor Street, Room #9A05
Ft. Worth, Texas 76102

Dear Mr. Young:

I apoligize for not responding sooner to your phone call recently concerning Mr. Wheelock's memorandum to Task Force members of the South Central Region.

I noted that Jim Bruggeman has responded on behalf of Jack Wells from Central and South West Services and I concur in the fact that the meaning of "total basis" regarding WTU and CPL split savings should be clarified. I believe that in the original comments that I made concerning this information that the proper wording was contained, however, in recent changes made as a result of continuous editing, the meaning of the original text was not carried through. My original suggestion read as follows:

> "Central Power and Light and West Texas Utilities would like to point out the fact that they have had a working agreement and have been successful in exchanging power on an economic basis. Since 1973, 2,904,183 MWH's have been exchanged between the two companies, which has resulted in $4,436,290. savings in energy costs for Central Power and Light Company and correspondingly a considerable savings to West Texas Utilities Company, which results in proportionate savings to the consumers of both companies."

Also, as a matter of interest to the Task Force report, the members of the STIS are involved at present in a trial period of operation on an Energy Brokerage System. As you probably recall, Mr. R. T. Sweatman of the Public Utility Commission of Texas wrote a letter in March of this year asking for comments as to whether or not Texas could benefit from a brokerage operation similar to one which is operating in Florida. Although this trial period of operation has been for a short term, it appears that from results which were recently discussed in a meeting of the STIS group here in Corpus Christi on October 10th, that this type of operation will be of significant advantage to the participants. If you are interested in further information concerning this Energy Brokerage System, we could provide you with further details.

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Central Power and Light
Corpus Christi, Texas
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Tulsa, Oklahoma
Southwestern Electric Power
Shreveport, Louisiana
Abilene, Texas

Mr. Leonard Young
October 13, 1980
Page 2

I would also like to state that it has been a pleasure serving as a Task Force member of the South Central Region. I have greatly benefited by the experience since it has been very informative as to what many of the utilities throughout the region are doing as far as pooling is concerned and also the potential for further pooling. It has been interesting to become aware of many of the problems and impediments that we have to this effort and hopefully over a period of time that many of these impediments can be overcome so that customers of the utilities can benefit by such pooling efforts.

Very truly yours,

W. P. Smith, Jr.

W. P. Smith, Jr.
Vice President
Generation, Transmission
and Distribution

WPS/jMc

cc: M. L. Borchelt
J. C. Wells
Jim Bruggeman

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